

LEARNING ACTIVITIES

CHAPTER 3



CLIMATOPIA



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Introduction

The Climatopia project is about using Education for Sustainable Development (ESD) in learning for the Sustainable Development Goals (SDGs), and thus contributing to the achievement of the SDGs. The Handbook suggests topics for discussion and reflection, learning activities, experiments and methods of implementation, without in any way aiming to be prescriptive, but rather to provide guidance and suggestions that adults, whether teachers in the school setting or parents/guardians/carers at home, can select and adapt to suit their specific learning environments.



Image from public domain. Source: Pxhere

Part A: Application of Choice Theory in ESD

Climate change urgently requires a change in our way of life and a transformation in the way we think and act. To achieve this change, we need new skills, values, and behaviours that lead to more sustainable societies. If we as a community assume that all people have the same basic needs, then we have a solid foundation based on empathy and understanding. Based on this approach, the following activities have been developed to promote the right types of values and skills that will lead to sustainable and inclusive development, and peaceful coexistence.

The theoretical concepts are derived from William Glasser's choice theory and Marshall Rosenberg's non-violent communication.



Photo teenage students studying with open book at table. Source: Freepik.

Interviews

The pupils of a class form pairs. Their task is to interview other pupils about a particular question. They can either write down the answers of their interview partners or record them with their smartphones.

In the follow-up, they summarise the answers and give a short report on the main findings in front of the class.

Interview questions: Pupils can choose one of these questions:

Fun

- ➔ What new things have you heard or learned recently that could help us to protect the climate?
- ➔ Do you have an idea for a creative activity to raise awareness about climate protection?

Power

- ➔ Many people currently feel powerless or overwhelmed when it comes to climate protection. What small steps can each of us take that will make a difference?
- ➔ What opportunities can arise for people if they start to change their behaviour?

Freedom

- What decisions have you already made in your life to contribute to climate protection?
- Would you accept restrictions in your life for climate protection? - Which ones?

Love & Belonging

- Where do you think it is important to team up with others to make a difference in climate protection?
- How do you talk to your friends about climate protection? - How do you make them aware when they behave in a way that is harmful to the climate?

Security & Survival

- What makes you confident when you think about climate protection?
- What do you think is particularly worth protecting in times of climate change?

More options for working in the classroom

1. Interviews with pupils from other classes

Pairs can also interview pupils from other classes. The pupils think up the interview questions themselves.

2. The pupils themselves invent the interview questions.

In classes with older pupils (13+) you can let the pairs work out their own questions. For example, they can draw a need from prepared need cards or they can choose one themselves. They should find an interview question for this need, which they should then use to interview their classmates.

3. Interviews with teachers and the school management

The pairs choose one question for each need and interview other teachers or the school management.



Mishela Rosano. (2018). Photo collage on how climate change is transforming Canada. Source: Canadian Geographic.

Collage

A collage is made up of individual pictures (cut-outs from magazines, newspapers, advertising leaflets, postcards, etc.). Cut out suitable pictures, arrange them on a sheet of paper (A4, A3, or a poster for group work) and glue them on. The collage can also be enriched with other stylistic elements, such as paint, colourful ribbons or wool, shells, leaves, or other parts of nature.

Ask your pupils to collect magazines and illustrated books and to bring nature materials before the activity is planned. You can also contribute. The more materials, the better.

Through the creative work, the pupils should get into a positive, appreciative mood and connect with nature in an emotionally empathetic way.

The aim is to make the pupils aware of how valuable and unique nature is for all of us. From this feeling, the impulse or motivation can arise to take good care of nature and to want to protect it.

Give the pupils the following instructions (the needs in brackets are only for information and do not have to be mentioned):

Cut out pictures of nature that you think express the following:

- Pictures that express the feeling of freedom (Freedom)
- Pictures that express what a joy it is to live on earth (fun)
- Images that express for you the power of nature (power)
- Images that express your love for nature (love and belonging)
- Images that express how the earth feeds us all and gives us security (security and survival)

Options for working in the classroom

1. Individual work:

- Each pupil makes his or her own collage with all the needs and finds a suitable title.
- Each pupil chooses one of the needs, makes a collage, and finds a suitable title.
The pupils can display their collages and let the others guess which need it is.

2. Pair work: The pupils work together in pairs and make a collage together.

3. Group work: The class is divided into 5 groups of equal size. Each group makes a large collage on one of the basic needs and finds a title.



Photo by Inez & Vinoodh. Source: YouTube

Get in the Mood with a Song

Go to Youtube and listen to the song "It's only four degrees" by Anohni:
<https://www.youtube.com/watch?v=Fi0q0O4V5Qs>

Play the song to the class. You can also print or display the lyrics. Afterwards, invite the class to think about and discuss the following questions.

- What do you think the artist wants to say with this song?
- What feelings does this song evoke?
- How do you think people can be encouraged to be more active for the environment?

More options for working with the class

1. Individual work: You can also give the song as homework, for example: Listen to the song and pay attention to what it does in you. Write an essay in the form of a letter to the artist. Write your thoughts about her song.

2. Introduce the topic: Maybe you know other songs or films that want to wake up and raise awareness for the topic. Use these media as an introduction to the topic or as a starting point for discussions.

In an interview, Anohni once said referring to this song:

"I had to do a sonogram for my heart a couple of months ago. I saw my heart beating for the first time in my life, and I was shocked to see it so intimately, to see its movement and its delicacy, its relentless commitment to supporting my life. And yet I'd taken it for granted. I think most people around the world have that same relationship to nature. I think most people around the world don't have any embodied understanding of the fact that their lives depend on the biosphere, that all of these things—the forest and ocean systems, the Arctic and Antarctic—are like the organs of the Earth and without them the body will die."

Source: <https://pitchfork.com/thepitch/anohni-reflects-on-her-climate-crisis-anthem-4-degrees-and-the-fight-for-the-planet/>



Experimenting with gestures. Source: Freepik.

Reaching Consensus on Different Scenarios

This tool is ideal whenever a team needs to agree on a decision.

Which option does the class choose?

Option 0: We do not change our behaviour, it stays as it is.

Option 1:

Option 2:

Option 3:

The advantages of this exercise are:

- The pupils are encouraged to participate actively in the lesson.
- The pupils are encouraged to think and reflect.
- The pupils are trained in the method of systemic consensing.




The aim is not to make a decision, but to make opinions and tendencies visible in the class.

The method of Systemic Consensing briefly explained

First read out option 0 and ask for everyone to give their hand signal to this option at the same time.

Table 1

The method of Systemic Consensing briefly explained

	Both hands down means: I can fully go along with this solution; I agree. This is also called consent .
	One hand down and one hand up means: In principle, I can also go along with this solution, but I have reservations. I have an objection.
	Both hands up means: I cannot support this solution because I see one or more essential values of myself or our community endangered by it. I have a resistance.

For each option, enter the number of hand signals in a table like this.

Table 2

Recording of hand signals

	Consent	Objection	Resistance
Option 0			
Option 1			
Option 2			
Option 3			
Option 4			

The best option is the one with the least objections and no resistance. If there is no option with no resistance (both hands up), the best option is the one with the least resistance. To get more information, you can ask those who showed their resistance about what values they regard as at risk. And what they propose as a better option.



Young activists taking action. Source: Freepik.

Change Talk

A change talk is simulated for one or more concrete situations. The pupils have to match the statements correctly.

Advantages of how it is now

Fun
Power
Freedom
Love & Belonging
Survival

Disadvantages of how it is now

Fun
Power
Freedom
Love & Belonging
Survival

Disadvantages associated with a change

Fun
Power
Freedom
Love & Belonging
Survival

Advantages a change could bring

Fun
Power
Freedom
Love & Belonging
Survival

Part B: Development of the Homonomous Self



Galaxy Andromeda. Public Domain Photo. Source: Needpix.

My Homonomous Self

On a sheet of paper the pupils draw a spiral, their personal spiral. Alternatively, if they find it difficult, an adult or a classmate can draw it. If all the members of the group find it difficult to draw the spiral you can print out the spiral available in Appendix I.

Ask pupils to place themselves in the centre of the spiral. They can use a small photo of themselves, represent themselves abstractly with a sketch or even use an avatar.

For the next stage of the process take some time. Allow a week to pass by reminding pupils of the task.

Pupils should envision the future they want for themselves. They should prioritise their basic needs. What is important and what is not.

They should then list the groups they are connected to on the spiral, starting with the closest ones such as family and class group and moving on to wider and wider groups they are connected to.

Some milestones in the implementation of the Climatopia educational programme at which pupils can reflect on their personal spirals and revise them if there are changes in the mapping of their connections are:

- ② at the end of the first phase of the implementation, having worked on the co-creation of the comics;

- Ⓢ at the beginning of the second implementation phase, before engaging with the game, and
- Ⓢ at the end that is after completing the game.

Some questions that adults, whether teachers or parents/guardians/carers, can ask children to facilitate their reflection and self-evaluation are suggested:

- Ⓢ Do the groups you associate with facilitate or hinder your goals?
- Ⓢ If they facilitate think how and if they hinder think how?
- Ⓢ During the implementation of the Climatopia educational programme did you make connections with new groups?
- Ⓢ How does prioritising your basic needs affect your connections with the groups you belong to?
- Ⓢ What basic need, or more than one, does each group you participate in meet?
- Ⓢ Is there a group you are currently associated with that is blocking the fulfillment of your basic needs or prioritization that you have set that you would consider disengaging from?
- Ⓢ Is there a group that makes it difficult for you to achieve your goals and from which you would therefore consider disengaging?
- Ⓢ Is there a group that makes it difficult for you to disengage from it if you wish? If so, in what way does it make it difficult for you to disengage/leave?
- Ⓢ Is there a group that promotes your goals and you wish to deepen the connection and devote more of your time to it?

The Tree of Knowledge

Draw a tree on metre paper. We glue the spirals of our group to its branches and create the artwork "The Tree of Knowledge".



Figure 8. Pyrini A. (2016). "The Knowledge Tree," artwork created by the students of Group 2 (ST'2) of the 1st Primary School of Rafina. [Photograph].

The Forest of Knowledge

Place the knowledge trees on a wall in your school and create "The Forest of Knowledge".

Don't forget to inform "visitors to the forest" about what each tree is!

Part C: STEM and Climate Change

The Climatopia OERs

At the heart of the development of the project's educational material is a story entitled "**Climatopia**". The story includes all the scientific knowledge necessary for pupils to understand the phenomenon of climate change. "Climatopia" is supplemented by a Comic Book also entitled "Climatopia" (Project Result 2.1: The Climatopia Comic Book) containing six stories based on chapters 15-20 of the book. The six stories in the comic book are deliberately unfinished, so that the pupils can work together and give their own ending.



A detailed guide entitled "**A Self-Training Handbook**" was developed (Project Result 2.2) for adults working with pupils—either teachers or parents/guardians/carers—on how they can support them in the process of completing the comics. The Handbook includes three chapters:

Chapter 1: The Basic scientific concepts related with climate change;

Chapter 2: Guidelines on the general components of comic creation activities; and

Chapter 3: Open Educational Resources for comics creation.

The educational material is complemented by Worksheets, which help pupils focus on the STEM concepts explored in the story.

STEM Activities Deployment Plan

It is suggested that the text and the comic be completed in eight teaching units.

Teaching Units 1-3 deal with the basic concepts related to the causes of climate change. These concepts and the network of relationships between them are illustrated in the concept map below (Figure 1).

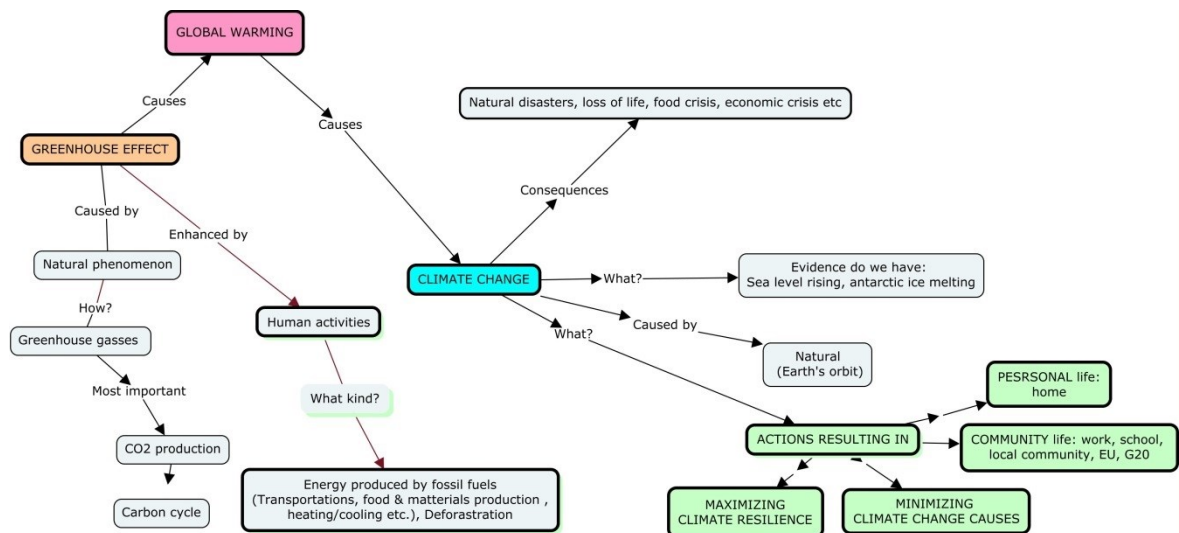


Figure 2. Ioannides Christos (2022). *The Climatopia Conceptual Map*.

In Units 4-6 pupils discuss the impact of climate change on six different areas of social activity.

In Units 7-8 pupils use all the knowledge and skills they have acquired to propose solutions to the problem of climate change by composing their own ending to the comic.

The text of the story is used as a reference text so that pupils can refer to, identify, and elaborate on the concepts under study. As a form of storytelling with which pupils are familiar, the comic brings the characters to life and helps children identify with them and seek solutions together to the problem of climate change.

Then, lesson plans are suggested for using the educational material by unit. Each teacher has the possibility to adapt the lesson plans according to the dynamics of his/her classroom.

Teaching Unit 1. The Greenhouse Effect

Lesson plan 1 Introduction, Chapter 1 to Chapter 3	
Overview of the Lesson	In the first unit pupils are introduced to the topic and the aims of the project. They are then introduced to the concepts of 'climate-weather' 'climate change' 'greenhouse' and 'greenhouse effect'. Also, pupils are introduced to the characters in the story.
Objectives	At the end of the module pupils will be able to: <ul style="list-style-type: none"> • Distinguish and correctly use the terms "climate" and "weather". • Give correct examples of climate change. • Describe the greenhouse effect and explain how it affects the average global temperature. • Describe the function of the greenhouse and explain the similarities between the function of the greenhouse and the greenhouse effect.
Materials - Sources	Copies of the story text, cartons of various sizes, clear plastic, thermometers, ice cubes.
Activities	
Group formation Duration: 5min	The children are divided into groups of 4 to 5 people. They give names to their groups. They choose a child as "leader" who will coordinate the work of the group. They choose a "presenter" who will present the work of the group to the class. Another child will be the "secretary" who will take notes and write down the group's answers. The teacher's involvement in this process will depend on the maturity and readiness of the group members.
Work at Classroom Level Duration: 5min	The teacher together with the pupils reads the introduction to the class and explains to the children that Climatopia is a twin planet of Earth. Therefore, many of the changes observed in Climatopia also occur on our planet. By studying the changes in Climatopia, we gain a better understanding of the changes on our planet.
Work in groups at classroom level	A copy of the text is distributed to each pupil and one worksheet per group. The

Duration: 50min	teacher distributes worksheet 1 and asks them to answer the questions after reading chapters 1 to 3. Depending on the age of the pupils and the dynamics of the class, the text can be read by the teacher to save time, while it is projected on the classroom blackboard. The text of the story can be read in two ways: The pupils read the chapters of each section in their entirety and answer the questions on the worksheet or alternatively the teacher can interrupt the reading at the points where the answers to the questions are given. The latter is suggested to be used at younger ages.
Work in groups Duration: 15min	Pupils work together to answer questions 1 to 4 on the worksheet. Pupils can find the answer to Question 1 in chapter 1. For questions 2 and 3, the children are asked to relate what happens in "Climatopia" to their personal experiences. To answer question 4, children can draw information from chapter 3. The first part of question 5 can be answered by reading chapter 3 of the text.
Work at class level Duration: 15min	The pupil who is the presenter then presents the group's answers to the class. The groups' answers on the worksheet are compared and a discussion follows.
Work in groups	The answer to question 5 requires pupils to build their own greenhouse like the children in the story. The construction of the greenhouse can also be done in the art lesson. Detailed instructions are given to the groups for the construction, as well as the necessary materials. To demonstrate how the greenhouse works, the pupils can refer to the information in the text or suggest their own way (for example, they can use two ice cubes and observe which one melts faster, the ice cube inside or outside the greenhouse).
Instructions for the construction of the greenhouse	There are several ways to build a greenhouse. Common to all of them is to have a transparent dome covering a surface to allow the sun's rays to pass inside. A simple way is to use a cardboard box as the frame of the dome. Using a cutter, remove rectangular sections from the sides of the box, leaving only the edges. The sections of

the sides that have been removed are replaced with pieces of clear plastic that are glued to the edges with adhesive tape or heated silicone.

On the four sides of the greenhouse we draw rectangular 'windows'. Use the cutter to score all three sides except the top side, so that half of the cut piece of plastic opens upwards. This way the window can be open or closed depending on what we want. By having open or closed windows, pupils can observe how the internal temperature of the greenhouse is affected.

Worksheet 1

- 1) Are "climate" and "weather" two different concepts? If so, what is the difference between them? Write two sentences that we use in our daily lives that contain the concepts of climate and weather.
- 2) Have you heard people say that the climate in your country has changed in recent years? Have you noticed significant climate changes happening in your area?
- 3) Have you heard of climate change happening on our planet? Can you name some of them?
- 4) What is the greenhouse effect and how does it affect the Earth's temperature? Why is it called that?
- 5) How does a greenhouse work? We build our own greenhouse! Show that your greenhouse works.

Teaching Unit 2. Greenhouse Gases

Lesson Plan 2 Chapter 4 to Chapter 8	
Overview of the Lesson	In the second unit, pupils learn about greenhouse gases and how they are emitted into the atmosphere. They also learn about the variation of their quantity in the atmosphere, the people and laboratories that measure variations in their quantity and their role in climate change.
Objectives	<p>At the end of the module pupils will be able to:</p> <ul style="list-style-type: none"> • Name the greenhouse gases and explain why carbon dioxide is the most important. • Describe the production of carbon dioxide through combustion and the mixing of baking soda and vinegar. • Detect carbon dioxide with the aid of lime water. • List methane as the second major greenhouse gas and the main sources of methane in the atmosphere. • Describe how the amount of carbon dioxide varies and how these measurements are made by special measuring stations in different parts of the world. • Explain the reasons for the increase in carbon dioxide in the atmosphere in recent years. • Explain the causes of past climate change. • Relate the greenhouse effect to the climate change observed over the last 150 years.
Materials - Sources	Copies of the story text, lime water, vinegar, baking soda, straws, container
Activities	
Work in groups at classroom level Duration: 60min	Pupils keep the groups they formed in the first teaching unit. Each group is given a copy of the text and the second worksheet per group in groups of 2 or 3. The teacher asks the children to answer the questions after reading chapters 4 to 8. Depending on the age of the pupils and the dynamics of

	the class, the text can be read by the teacher to save time, while it is projected on the classroom board (60 minutes).
Work in groups Duration: 20min	Pupils work together to answer questions 1 to 9 of Worksheet 2 (20 minutes). The answer to Question 1 can be found in Chapter 4. At the point where the riddles are mentioned, it is suggested that the reading should be interrupted and the pupils should answer the two riddles (Question 2) together with the characters in the story. To answer Question 3, the pupils are asked to carry out the experiment described in the statement of the question. Since it takes a long time to complete the experiment, it is suggested that the experiment be carried out in the science lesson. Question 5 is answered in Chapter 5, which deals with greenhouse gas measuring stations. Question 6 is answered in Chapter 6. Question 7 asks children to relate the increase in the amount of carbon dioxide in the atmosphere to the greenhouse effect and the increase in global temperature, which in turn causes climate change (Chapter 7). Finally, the answer to question 8 can be found in Chapter 8. Chapter 8 addresses an important misconception about the climate change we are experiencing, namely that it is caused either by the movements of the earth or the activity of the sun. Children should understand the difference between the climate change that is happening today and those of the past (20 minutes).
Work at class level Duration: 20min	The pupil who is the presenter then presents the group's answers to the class. The groups' answers on the worksheet are compared, followed by a discussion.

Experiments

Instructions for conducting the carbon dioxide combustion experiment	
Preparation	<p>To make lime water, dissolve one tablespoon of slaked lime - sold in building material shops - in one liter of water. Strain the solution through a coffee filter so that the solution becomes clear. Put the solution in a transparent container.</p> <p>To collect the smoke produced by burning the wax, take a 250ml plastic water bottle. Use a cutter to remove the bottom of the bottle. In the lid we make a small hole in which we fit a long, elastic tube 20 cm long.</p>
Procedure	<p>Place the candle on the table, light it and place the plastic bottle on top of it, so that the burning smoke escapes through the tube. The other end of the tube is immersed in the lime water container. Note that the solution becomes cloudy, which is proof that the smoke contains carbon dioxide.</p>
Instructions for conducting the experiment to produce carbon dioxide by mixing soda with vinegar	
Preparation	<p>Drill a small hole in the lid of a 250 ml plastic bottle into which a long, 20 cm long, elastic tube is inserted.</p>
Procedure	<p>Pour five tablespoons of baking soda into the bottle. Then pour in vinegar and close the lid with the tube, while the other end is immersed in the lime water. The pupils observe that bubbles are produced in the bottle - evidence of gas production. The gas is injected into the lime water and makes it cloudy, evidence that the gas produced is carbon dioxide.</p>

Worksheet 2

- 1) Why are some gases called "greenhouse gases"? What are they, which is considered the most important and why?
- 2) "Plants with light separate us and life goes on, but when it is lit it unites us in the moment..."

"I am dust that swells the sweets and you were wine in the old days, put us together to be foams..."

I solve the two riddles and find out how carbon dioxide is produced.

- 3) To prove that burning a material or pouring vinegar into soda produces carbon dioxide, do the following experiment:

With the teacher's help, we take a candle and place it lit in a special glass container with a spout, so that the gas produced is directed into a container containing a solution of lime water.

Comment ...

Explanation ...

- 4) The second most important greenhouse gas is methane. What elements does it consist of? How is it produced?
- 5) How do we know that the amount of greenhouse gases in the atmosphere is changing?
- 6) What are the reasons for the increase in carbon dioxide in the atmosphere over the last 150 years?
- 7) Is the greenhouse effect related to climate change? If so, in what way?
- 8) Have there been changes in the climate of the planet in the past? What were the causes of these changes?

Teaching Unit 3. The Effects of Climate Change

Lesson Plan 3 Chapter 9 to Chapter 14	
Overview of the Lesson	In the third unit, pupils learn about the effects of climate change. In particular, they learn about forest fires, floods, melting glaciers, rising sea levels, sinking coastal areas, and how these natural disasters are related to each other and to global warming.
Objectives	<p>At the end of the module pupils will be able to:</p> <ul style="list-style-type: none"> • Connect forest fires and floods with climate change • Connect the melting of ice with the greenhouse effect • Identify coastal areas of the world that are at risk of flooding due to global warming • Explain why even a small increase in the average global temperature has serious consequences for climate change • State that our actions to address climate change are: a. to limit the emission of greenhouse gases into the atmosphere and b. to address the consequences of climate change. • State the concern about the relationship between modern civilization and the natural environment.
Materials - Sources	Photocopies of the text, video projector.
Activities	
Work in groups at classroom level Duration: 60min	Pupils maintain their groups. Each group is given a copy of the text and worksheet 3. The teacher asks the children to answer the questions after reading chapters 9 to 14. Depending on the age of the pupils and the dynamics of the class, the text can be read by the teacher to save time, while it is projected on the classroom board.
Work in groups Duration: 40min	Pupils work together to answer questions 1 to 12 of Worksheet 3 (20 minutes). Question 1 explores children's perceptions of the causes of forest fires and whether the increase in the number of forest fires can be

	<p>linked to climate change. In question 2, pupils should mainly refer to the lack of organization and escape routes. Question 3 explores children's perceptions of the causes of flooding and whether the increase in the number of floods can be linked to climate change. Question 4 asks pupils to make a hypothesis about the causes of flooding. However, specific answers on the phenomena of floods and forest fires and their relationship with climate change are given in Chapter 12. Answers to questions 5 and 6 are given in Chapter 12. Answers to questions 7 and 8 can be found in Chapter 13. Question 7 seeks to address the widespread misconception that a small increase in the average global temperature cannot affect the climate. Question 9 asks children to infer the effects of climate change from the fictional planet to planet earth and reflect on them. Questions 10 and 11 are about renewable energy sources and some answers can be found in Chapter 14. What should be stressed is that renewable energy sources must also be used in an environmentally friendly way. Finally, question 12 asks children to reflect on the relationship between modern man and nature and the consequences of this relationship. A more extensive discussion is suggested in the language lesson, after searching the entire letter of Chief Seattle of the Indians, on the Internet (20 minutes).</p>
<p>Work at class level Duration: 20min</p>	<p>The pupil who is the presenter then presents the group's answers to the class. The different groups' answers on the worksheet are compared, followed by a discussion.</p>

Worksheet 3

- 1) In recent years there has been an increase in fires on our planet. How do you think this phenomenon is related to climate change?
- 2) What were the reasons that prevented Climatopians' escape from the fire that threatened their lives?
- 3) Floods have increased on our planet in recent years. How do you think this phenomenon is related to climate change?
- 4) What could be the reasons for the great flood?
- 5) Why is the city of Melan sinking? Have you heard of areas of our planet where this phenomenon is occurring? What consequences do you think this phenomenon might have on people's lives?
- 6) In what way does melting ice contribute to global warming?
- 7) Over the last 150 years, the average temperature increase in Climatopia has increased by about 1 degree. A similar increase in the average temperature has been observed on our planet. How significant do you think an increase of this magnitude is for the climate of our planet? Explain your answer.
- 8) Our actions to address climate change should be aimed in two directions. What are they?
- 9) While reading about the future consequences of climate change in Climatopia, think about what could happen to our planet in the future if nothing changes.
- 10) Are there ways to produce electricity without burning fossil fuels? Name a few.
- 11) Can producing energy with renewable energy sources (wind turbines - photovoltaics) cause problems for the environment?
- 12) In 1830 the United States forced a tribe of Indians off their land after asking them to sell it to them. The chief of the Indians wrote a letter to the president of the United States. The following is an excerpt from that letter. After reading it, compare it with the words of the Four Elements to the children ("You climatopians.... By nature?")

"How can you buy or sell the sky - the warmth of the earth? It seems to us strange. The coolness of the wind or the fragrance of water, however, do not belong to us. How can you buy them from us? Every part of this land is sacred to my people. Every glistening pine needle, every sandy beach, every blur in the dark forest, every clearing and every buzzing bug is, in the memory and experience of my people, sacred.

We know that the white man does not understand our ways. The parts of the earth, one with another, make no difference to him, because he is a stranger who arrives by night and takes from the earth all that he needs. The earth is not his brother, but an enemy who must conquer it, and having conquered it, he goes on."

Teaching Unit 4. The Effects of Climate Change

Lesson Plan 4 Chapter 15 to Chapter 16	
Overview of the Lesson	In the fourth unit, pupils study the effects of climate change on economically developed and less developed regions of the world. They are introduced to the concepts of 'climate justice' and 'climate refugees' and reflect on the role of education in people's relationship with nature and technology. In particular, the lesson focuses on how schools can foster a balanced relationship between young people and nature and technology.
Objectives	At the end of the module pupils will be able to: <ul style="list-style-type: none"> • Give examples of the absence of "climate justice" • Give examples of 'climate refugees'. • Cite habits of modern lifestyles that exacerbate the problem of climate change. • Identify the role that education can play in reducing the effects of climate change. • Indicate the relationship between modern education, nature and technology.
Materials - Sources	Photocopies of the text, photocopy of the comic, video projector.
Activities	
Work in groups at classroom level Duration: 50min	Pupils keep their groups. Each group is given a copy of the comic and the text and Worksheet 4. Along with the comic, the teacher distributes photocopies of the story text to the children so that they are able to refer to the relevant chapters and obtain more information. The teacher asks the children to answer the questions after reading the first two social contexts from the comic (Chapters 15 to 16 of the text). Depending on the age of the pupils and the classroom dynamics, the comic can be read by the teacher to save time, while it is

	projected on the classroom blackboard with a projector.
Work in groups Duration: 40min	Pupils work together to answer questions 1 to 8 of Worksheet 4 (20 minutes). Question 1 and introduce the concepts of "climate justice" and "climate refugee" and can be answered through the comic strip. Question 3 asks children to identify and record behaviors of the couple in the city that contribute to climate change. Question 4 asks children to record lifestyle habits that contribute, even if only slightly, to climate change. Question 5 is an open-ended question that gives pupils the opportunity to express their own criteria in choosing a school. The answers to questions 6 and 7 can be found in the comic strip. The pupils compare the two schools in terms of their relationship with nature and technology. For question 8, pupils should point out how education can encourage young people's relationship with nature, which in turn is the key to mitigating the effects of climate change (20 minutes).
Work at class level Duration: 20min	The pupil who has the role of presenter then presents the group's answers to the class. The groups' answers on the worksheet are compared, followed by a discussion

Worksheet 4

- 1) Climate Justice is a term used in relation to the effects of climate change. Specifically, it refers to when those least responsible for global warming suffer more from its consequences. Can you find such an example in the comic?
- 2) Climate refugees are people who are forced to flee their homes due to natural disasters caused by climate change. What is the reason why Climatopians from the poor village are forced to migrate? Could we call them climate refugees?
- 3) Do you think that the family's lifestyle in the city contributes to climate change? If so, in what way?
- 4) Does our own lifestyle contribute to climate change? If so, in what way? Give examples.
- 5) Which of the two schools would you like to be a pupil at and why?
- 6) What do the principals of the two schools think about the role of technology?
- 7) What is the relationship between the two schools and nature?
- 8) In what way can education contribute to mitigating the effects of climate change?

Teaching Unit 5. Ecological Footprint

Lesson Plan 5 Chapter 17 to Chapter 18	
Overview of the Lesson	In the fifth unit, pupils are introduced to the concept of "ecological footprint" and learn how livestock production affects greenhouse gas production, and the difficulties in implementing organic farming. They are also informed about the consequences of urban forest fires, the relationship between forest fires and floods, and ways of preventing forest fires.
Objectives	<p>At the end of the module pupils will be able to:</p> <ul style="list-style-type: none"> • Identify the ecological footprint of people's activities. • Identify the ways in which livestock farming affects the production of greenhouse gases. • Indicate the reasons why organic farming is difficult to implement. • List dietary habits of people that increase or decrease greenhouse gases. • Give examples of forest fires in their country and measures to prevent them. • Explain how floods are linked to forest fires.
Materials - Sources	Photocopies of the text, photocopy of the comic, video projector.
Activities	
Work in groups at classroom level Duration: 50min	Pupils maintain their groups. Each group is given copies of the comic and the text, as well as the fifth worksheet. The teacher asks the children to answer the questions after reading the third and fourth social contexts from the comic (chapters 17 to 18 of the text). Depending on the age of the pupils and the classroom dynamics, the comic can be read by the teacher to save time, while it is projected on the classroom board.
Work in groups Duration: 40min	Pupils work together to answer questions 1 to 8 of Worksheet 5 (20 minutes). Question 1 introduces the concept of "ecological footprint" and can be answered through the comic. Question 2 asks children to list the reasons that prevent the implementation of

	<p>organic farming and can be answered through the comic. Question 3 asks children to list the contribution of livestock activities to the production of greenhouse gases and can be answered through the comic. Question 4 gives children the opportunity to list alternative eating habits that contribute to reducing the production of greenhouse gases. Here again, children find the answer in the text, as in Question 5. Question 6 invites pupils to reflect on and list the reasons why people refuse to accept the recommendations of experts on issues relating to the prevention of natural disasters. Question 7 is open-ended and gives children the opportunity to list actions to prevent forest fires based on information from similar disasters in their own country. The comic and the text also contain relevant information that can be used.</p> <p>Finally, in question 8, pupils make a connection between two types of natural disasters, floods and fires. Answers to this question can be found in the comic in the social environments 'School' and 'City Council' (20 minutes).</p>
<p>Work at class level Duration: 20min</p>	<p>The pupil who has the role of presenter presents his/her group's answers to the class. The groups' answers are compared and a discussion follows.</p>

Worksheet 5

- 1) The "ecological footprint" is a way of measuring the effects of human activity on the earth. Does the use of chemical fertilizers containing nitrogen leave a large or small ecological footprint and why?
- 2) What are the difficulties in implementing organic farming?
- 3) In what ways does livestock farming affect the production of greenhouse gases?
- 4) What changes in the dietary habits of climatopians can reduce the production of greenhouse gases?
- 5) What recommendations does the environmentalist make to the City Councilors to protect the lives and property of climatopians from a forest fire?
- 6) Why do the City Councilors refuse to accept the environmentalist's suggestions?
- 7) Have you heard of forest fires that have threatened the lives and property of people in your county? What actions should people have taken to prevent these disasters?
- 8) Is there a connection between forest fires and floods? And if so, what do you think it is?

Teaching Unit 6. Preventing and Tackling Climate Change

Lesson Plan 6 Chapter 19 to Chapter 20	
Overview of the Lesson	In the sixth teaching unit, pupils learn about the collective action of states and their leaders to prevent and address the consequences of climate change. They also learn about the international conventions that have been signed and the reasons why their terms are not being implemented.
Objectives	<p>At the end of the module, pupils will be able to:</p> <ul style="list-style-type: none"> • Report information about the Paris Agreement on climate change in 2016. • Identify the reasons why fossil fuels continue to be produced and used. • List the economic reasons that prevent the use of renewable energy sources. • Identify the opportunities for citizens to influence the decisions of leaders. • Cite examples of the absence of 'climate justice' in international decisions. • Describe the changes proposed in people's lifestyles to address climate change. • Identify the need for and the difficulties in cooperation between states to tackle climate change.
Materials - Sources	Photocopies of the text, photocopy of the comic, video projector.
Activities	
Work in groups at classroom level Duration: 50min	Pupils maintain their groups. Each group is given copies of the comic and the text, as well as the sixth worksheet. The teacher asks the children to answer the questions after reading the fifth and sixth social contexts from the comic (Chapters 19 to 20 of the text). Depending on the age of the pupils and the classroom dynamics, the comic can be read by the teacher to save time and, at the same time, projected on the classroom board using a projector.
Work in groups Duration: 40min	Pupils work together to answer questions 1 to 8 of Worksheet 5 (20 minutes). Question

	<p>1 asks children to find information on the internet about the Paris Green Agreement and list the terms decided on to tackle climate change. Question 2 asks pupils to list the reasons why fossil fuel extraction continues on the planet, despite its negative effects on climate change, and to link them to the economic interests of countries. The answer is given in the comic and the text. Similarly, in Question 3, children have to identify and list the economic reasons that prevent the use of renewable energy sources. The question is answered in the comic strip and the reference text. Question 4 aims to get pupils to reflect on the role and potential of citizens in influencing the decisions of leaders, on such a serious issue as climate change. The answer is given in the comic and the text. Question 5 revisits the concept of 'climate justice' and asks children to identify examples of its absence at national level within the comic. Questions 6 and 7 ask the groups to identify and describe the changes proposed by the comic character (the teacher) to the lifestyle of climatopians, in order to address climate change in Climatopia, bringing these changes back to the lifestyle of people to address climate change on Earth. Finally, in response to question 8, pupils are asked to identify the need for cooperation between countries and, after identifying, list the economic and national causes that impede such cooperation both on Climatopia and on Earth. Children can find the answers in the last two social contexts of the comic (20 minutes).</p>
<p>Work at class level Duration: 20min</p>	<p>The pupil who has the role of presenter then presents his/her group's answers to the class. The groups' answers on the worksheet are compared followed by a discussion.</p>

Worksheet 6

- 1) In the Lagos Agreement, most countries in the Climatopia Agreement committed to limiting carbon dioxide emissions. Search online to see if a similar agreement was signed between countries on Earth.
- 2) Why do you think that even after the Lagos Agreement, the Climatopians continue to extract fossil fuels?
- 3) In the debate between the two leaders there is a disagreement about the use of renewable energy (photovoltaic and wind turbines). Why do you think this is the case?
- 4) Do you think that citizens can influence the decisions of the leaders to implement the Lagos Agreement? If so, in what ways?
- 5) Is there any mention of climate justice issues at the conference of 20?
- 6) What is the professor's suggestion to the leaders of the rich countries of Climatopia?
- 7) What changes in the lives of climatopians does the professor believe are necessary to address climate change?
- 8) How important do you think cooperation between countries is in addressing climate change? What do you think is preventing the leaders of the 20 richest countries in Climatopia from working together?

Teaching Unit 7. Creating a Comic Book: Part A

Lesson Plan 5 Chapter 21-Creating a Comic Book: Part A	
Overview of the Lesson	In the seventh unit pupils complete the reading of the text. They are asked to imagine what the future of Climatopia will be and what will happen in the six social environments at two future times.
Objectives	At the end of the unit, pupils will be able to: <ul style="list-style-type: none"> • apply the information they have received from the text and the comic book • connect the actions of the comic book characters with the future of the fictional planet • connect their own actions with the future of our planet.
Materials - Sources	Photocopies of the text, photocopy of the comic, video projector.
Activities	
Work in groups at classroom level Duration: 90min	<p>The teacher asks the children to read Chapter 21 of the text. Depending on the age of the pupils and the classroom dynamics, the text can be read by the teacher to save time and projected on the classroom board with a projector (15 minutes).</p> <p>When the reading of the text is completed, the teacher asks the children to travel in time and "see" the six different environments in two future moments: 10 years from now and 80 years from now. She/he asks them to imagine what will happen in the two homes, the two schools, the farm, what the councillors and the leaders of the countries will be discussing in these two future moments (see instructions for continuing the comic).</p> <p>The teacher then asks pupils to continue the comic by following the eight steps as outlined in the instructions for continuing the comic. In this unit, pupils will carry out the first four steps:</p> <p>Step 1: Deciding on the context of the comic</p>

(10 minutes)

Step 2: Forming groups (5 minutes)

Step 3: Developing the plot (40 minutes)

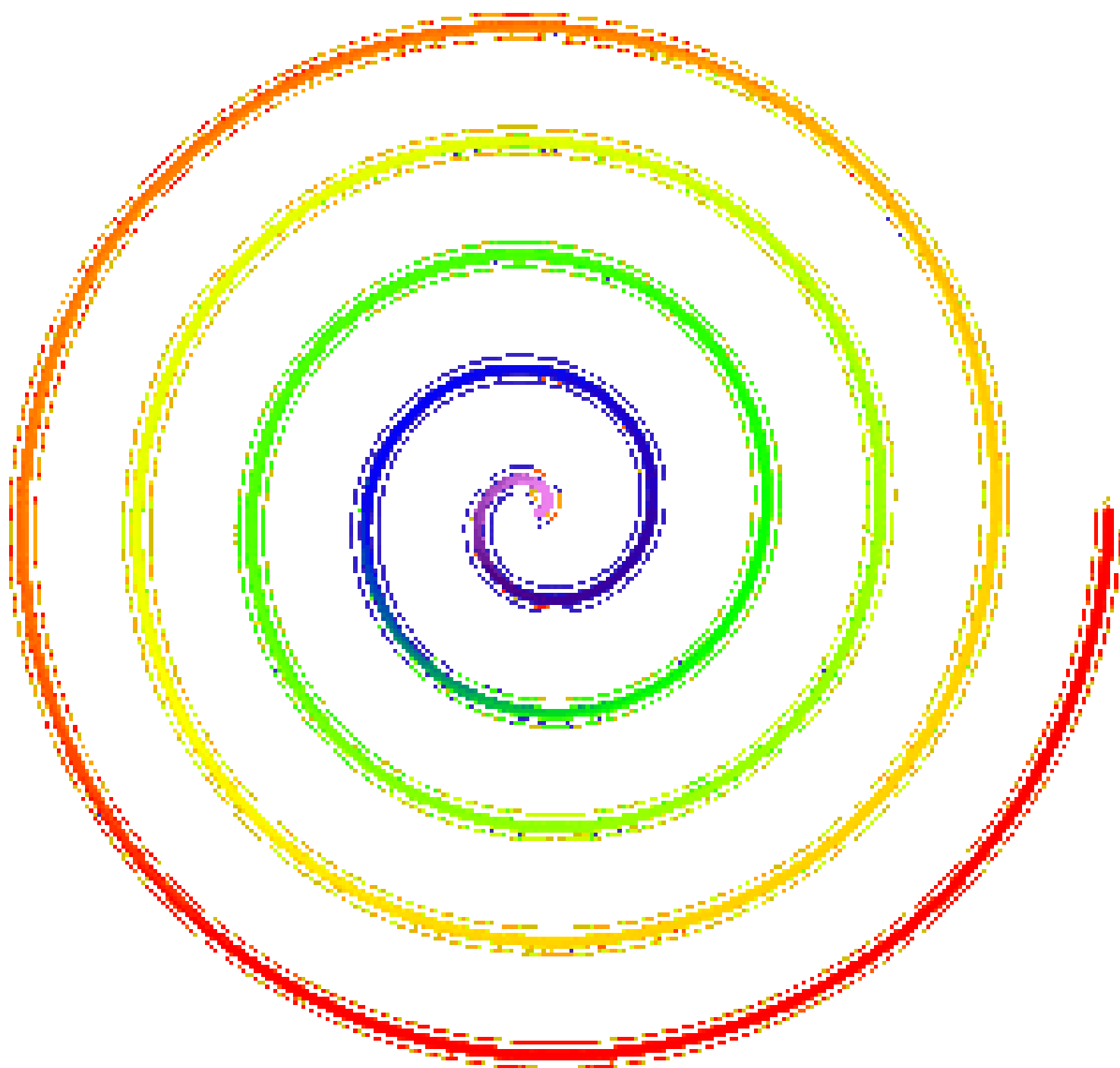
Step 4: Script writing (20 minutes)

Teaching Unit 8. Creating a Comic Book: Part B

Lesson Plan 8 Creating a Comic Book: Part B	
Overview of the Lesson	In the last unit, pupils complete the creation of the comic book. Pupil groups depict with images drawn on paper or digitally on a computer screen the scenario of the story of Climateopia, which tells what life in the six different social environments will be like at two points in time in the future.
Objectives	At the end of the module pupils will be able to: <ul style="list-style-type: none"> • Describe their vision of the future of our planet in relation to their own and other people's way of life. • Work in groups, choose roles, and plan actions to tackle climate change.
Materials - Sources	Photocopies of the text, photocopy of the comic, A4 glue sticks, colored pencils, and markers, or the digital comic creation app.
Activities	
Work in groups at classroom level Duration: 90min	<p>Pupils maintain their groups. They complete the comic book by following Steps 5 to 8 of the instructions, in case they use paper and pencil, or follow the comic book instructions in the digital app. Teaching time from the art or IT lesson can be used to complete the tasks.</p> <p>Step 5: Pencilling Step 6: Inking Step 7: Colouring Step 8: Lettering</p>

Appendix I

The Climatopia Spiral





CLIMATOPIA



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