Climate box

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IO2 Learning Activities

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Content

Module 5: Environment – Pollution and protection

This module focuses on the effects of climate change and global warming on our environment: flora, fauna, water and the climate itself. Be it air pollution through industrial factories, soil degradation due to over-plantation or the erosion of trees and greenery around the world. You see images and pictures but at the same time it might go past you. How is the arctic related to your daily behaviour? You have never even been near the rain forest; how does its destruction even relate to you? Why do people always talk about a “greener” environment?

This module revolves around the environment we live in and how our daily behaviour influences it.

Content:

Topic 1: Our Planet Earth – Climate and Atmosphere

Topic 2: Our Planet Earth – Water

Topic 3: Our Planet Earth – Plants and Animals

Topic 4: Protection and preservation

Topic 1: Our Planet Earth – Climate and Atmosphere

Earth, the third planet from the sun and the fifth largest planet in our solar system. Our home, made of many layers of iron, nickel, rocks and water. This topic revolves around our planet itself as well as how the weather and climate influence its atmosphere and life on the planet. What is the greenhouse effect? How does the sun affect climate change? Will our weather change due to global warming?

Methodology:

For this topic, the trainer should provide support in the learning by letting them discover and discuss the topics themselves. If the participants need more input or motivation, the trainer shall engage them with questions or by presenting real-life scenarios, enabling learners to connect the learning content to their daily life more.

Learning Objectives:

- Learn about all aspects of the planet Earth and its environment.
- Identify the influence of weather and climate on our planet and life.
- Being aware of the difference between weather and climate.
- Understanding how the consequences of Climate Change effect the planet and our environment.

Learning Materials:

M5-U1-M1

Learning Activities

Activity Nr.	M5-U1-A1
Activity Name	The Greenhouse effect – Step by Step
Activity Type	• Research activity • Discovery Learning • Visual Learning
Duration	30 minutes
Nr. of participants	Max. 15 participants
Language Level	✓ Progressive ☐ Moderate
Depth of information	✓ Basic (no required background knowledge) ☐ Advanced
Learning Objectives	- Learn more about the greenhouse effect - Become aware of the consequences of global warming on the environment and climate - Be able to discuss about the single events resulting in global warming

Description

Step 1: The participants receive 14 cards regarding the steps of the greenhouse effect. Steps include, for example, “Sun rays are reflected back to the atmosphere” and “Earth stays warm enough to sustain life”. The participants are then split into groups of 1-3 persons and are asked to work together on structuring the cards into their right order of what happens step by step during the greenhouse effect.

See Additional Material: M5-U1-M1.

Step 2: They can use the explanation on the cards themselves to find out more about the steps and guess in what order the steps are taking place. This shall help the participants to put them in the correct order.

Correct order: (1) Sun shines onto earth; (2) Sun rays are reflected back into space; (3) Sunlight is absorbed by earth's surface; (4) Greenhouse gases trap heat in the atmosphere; (5) Earth is heated by the absorbed sunlight; (6-9, order for these 4 cards is not mandatory) Carbon dioxide, Methane, Nitrous oxide, fluorinated gases; (10) Heat radiated from earth back into space; (11) Earth stays warm enough to sustain life; (12) Greenhouse gases grow exponentially; (13) More heat is trapped in the atmosphere; (14) Earth grows warmer and is more heated.

Step 3: Each group gets to present a few of their steps and all participants get to work together on putting everything in the correct order (if it was not correctly put together by any group).

Step 4: The trainer asks the participants the following questions:

- "Was there a step you did not know anything about?"
- "Is there a part that surprised you?"
- "What aspects of the greenhouse effect did you already know about?"

Online Implementation	When implemented online the trainer can send a link with the cards to all participants, together with the context descriptions. Afterwards the whole group can discuss their findings and order as with the original activity.
Sources	National Resources Defense Council (NRDC) (2019): *Greenhouse Effect 101*. Last retrieved 05.07.2021, <https://www.nrdc.org/stories/greenhouse-effect-101>

European Commission (n.d.): *Fluorinated greenhouse gases*. Last retrieved 23.07.2021, https://ec.europa.eu/clima/policies/f-gas_en

United States Environmental Protection Agency (EPA) (2019): *Greenhouse Gas Emissions*. Last retrieved 05.07.2021, <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>

Activity Nr.	M5-U1-A2
Activity Name	Alternative support
Activity Type	• Story/Experience sharing • Research activity
Duration	90 minutes
Nr. of participants	max. 10 participants
Language Level	✓ Moderate ☐ Progressive
Depth of information	✓ Basic (no required background knowledge) ✓ Advanced
Learning Objectives	- Learn more about alternative ways of climate production and reduction of consumption - Be able to discuss alternative ideas regarding one's daily behaviour to support environmental protection

Description

Step 1: The participants are asked to collect different aspects of daily life which they know take a toll on the environment, e.g., air conditioning, production of batteries, heating, not separating waste, overproduction/-use of plastic containers, single-use items, traffic, etc.

Step 2: After collecting about 10-15 aspects the trainer presents the participants with different scenarios for each and asking questions about alternative solutions. For example, taking “air conditioning”:

- “Continuous usage of air conditioners in summer takes a great toll on the environment. What alternative ways can you use to reduce this kind of usage?”
- “What are advantages/disadvantages of these alternative ways?”
- “Does this alternative method work everywhere or are there places on earth where people might have living/working conditions making this method disadvantageous?”

Step 3: The group as a whole or split into smaller groups (depending on the number of participants) can then use the internet or their pre-existing knowledge to answer the questions and to discuss alternative ways of behaviour to protect the environment and climate and where/in which situations these methods would work.

For example: Instead of heating, wearing warmer clothes or instead of driving the car each day using a bicycle or public transport.

Additional Remarks	To make the activity more interactive the participants have the option of writing down the alternative solutions on a flipchart, as well as their advantages and disadvantages. The depth of information for this activity depends on the level of knowledge on climate change of the participants.
Online Implementation	The activity can be implemented as it is in an online environment, but it might also be helpful to let the participants write down their ideas on a digital whiteboard.

Activity Nr.	
	M5-U1-A3
Activity Name	What is climate?
Activity Type	• Discovery Learning • Visual Learning
Duration	45 minutes
Nr. of participants	Max. 10 participants
Language Level	✓ Moderate ☐ Progressive
Depth of information	✓ Basic (no required background knowledge) ☐ Advanced
Learning Objectives	- Understand the different consequences of global warming on climate and on weather - Be aware of the difference between weather and climate - Identify the influence of weather and climate on our environment

Description

This activity revolves around the weather and climate on Earth and enables learners to explore the differences between weather and climate through discovery and research.

Step 1: The trainer splits the participants in two groups with one group exploring "Weather" and the other group exploring "Climate". The groups get 15 minutes to research online, through print materials and through discussion.

Step 2:

Group "Weather". This group should explore the following questions:

- "What is weather? How can you define it?"
- "Do we change our daily behaviour according to the weather?"
- "How does the weather influence climate change?"

Group “Climate”. This group should explore the following questions:

- “What is climate? How can it be defined?”
- “How does the climate influence the weather and our daily behaviour?”
- “How is the climate changing in the recent years?”

Step 3: Afterwards, each group has 5 minutes to present their findings to the other group. They can use presentations, images or practical questions to show them what they have learned. The trainer gives feedback and input at the end of each presentation, if necessary.

Additional Remarks	The trainer can give input for both groups. Weather: “Look outside. Is it hot? Is it cold? Is it snowing?” “If it is hot, what would you do differently from when it is cold? Is there something you would never do when it is snowing but only when the weather is sunny?” Climate: “Weather can change quite easily. How about climate?” “Are the yearly seasons the same in every country around the world? Why might they be different?”
Online Implementation	This activity can be implemented online via Zoom (and Breakout rooms) or other online meeting applications.
Sources	NASA (2017): NASA – What’s the Difference Between Weather and Climate? Last retrieved 05.07.2021, <https://www.nasa.gov/mission_pages/noaa-n/climate/climate_weather.html>

Topic 2: Our Planet Earth - Water

Over 70% of the earth's surface is water. Oceans, lakes or our drinking water, all of it is fundamental in human survival. The ocean absorbs more of the harmful carbon dioxide in the air than all trees and greenery on the planet. While the increasing heat around the world increases the ocean temperature, taking in harmful greenhouse gases turns the ocean acidic and uninhabitable for living beings.

This topic revolves around all kinds of water on our planet and in our life. It explores the human effect on water and what the future will hold for our planet's water, as well as how we can contribute to a cleaner ocean.

Methodology:

During this module it is important for the trainer to support the participants in discussion and debate on effects of climate change and global warming on water on the planet. They should lead the discussion through input and reflection but shall not be the biggest contributor to discussions themselves. This topic is focused on learning through discovery, visual input and sharing experiences and opinions.

Learning Objectives:

- Learn about all aspects of the planet Earth and its environment.
- Identify the influence of humans on the water on our planet.
- Raise awareness regarding the role of oceans and lakes in the cleaning of planet Earth.
- Understanding how the consequences of climate change effect water around the world.

Learning Materials:

M5-U2-M1

Learning Activities

Activity Nr.	M5-U2-A1
Activity Name	Our impact on water
Activity Type	• Story/Experience sharing • Visual Learning
Duration	30 minutes
Nr. of participants	Max. 10 participants
Language Level	✓ Moderate ☐ Progressive
Depth of information	✓ Basic (no required background knowledge) ✓ Advanced
Learning Objectives	- Discuss the effects of humans on water - Raise awareness regarding the negative effects of climate change on water around the world - Provide an input for the learners to discuss and talk about climate change

Description

Step 1: The trainer shows a short video to the participants, giving input for a discussion. The video shall revolve around climate change, the effects of humans on our environment or the future development of the water situation around the world (find video examples in the "Additional Remarks" section.

Step 2: The participants are first asked to recount what they saw in the video:

- "What is this video about?"
- "What happened in the video?"

- "Who (do you think) made this video?"

Step 3: Afterwards the trainer asks the learners to discuss the video and its context, based on, but not limited to, the following questions:

- "Have you ever seen a scene like it happened in the video?"
- "What is the expected effect of this video?"
- "What impact do you think does a video like this have?"
- "What did you think about this video personally?"
- "What consequences/effects do you draw from it personally?"

Additional Remarks	To further support visual learners, the trainer can also provide a flipchart for the learners to write down their thoughts. Possible video sources: Fundación Reina Sofia – Lemon (https://www.youtube.com/watch?v=0e2zK0v2XPA) Aardman Animations – Turtle Journey (https://www.youtube.com/watch?v=1iJbo3fhJFk) This activity can be implemented on all language and knowledge levels, depending on the chosen video input. If desired the depth of information for this activity can be increased by choosing more scientific videos to watch.
Online Implementation	It is recommended to either send the links to the participants before the activity is implemented, so they are able to watch the video with a stable internet connection. The trainer can also watch it together with the participants, if the connection is stable enough.

Activity Nr.	M5-U2-A2
Activity Name	Consequences on water
Activity Type	• Research activity • Discovery Learning • Visual Learning
Duration	60 minutes
Nr. of participants	Max. 20 participants
Language Level	✓ Moderate ☐ Progressive
Depth of information	✓ Basic (no required background knowledge) ☐ Advanced
Learning Objectives	- Learn more about the human effects on the water of the planet - Raise awareness regarding the negative consequences of human behaviour on the environment - Allow learners to engage in an interactive activity to explore the topic

Description

Step 1: The participants are split into groups of 2-4 people. Afterwards each group receives 10 worksheets. There are 10 situations described on the paper, with 2 possible consequences listed as options for each situation. The participants are asked to find the 10 effects which are happening due to climate change, global warming, and not enough protection for our planet, belonging to each situation. See Additional Material M5-U2-M1.

Correct answers:

- ***Ocean absorbs heat*** – Earth grows warmer, change of weather and temperature due to changing currents (correct) / cooler temperature in the air (false)
- ***Coastal regions*** – Climate change will cause more flooding (correct) / more buildings and living in coastal regions (false)

- *Coral reefs* – Coral bleaching, coral reefs dying due to warmer ocean temperature (correct) / Enhanced growing of coral reefs due to warmer ocean temperature (false)
- *Ocean absorbs greenhouse gases to clean the air* – Oceans become acidic and poisonous and the ecosystem changes, animals in the water die (correct) / Cleaner air and water (false)
- *Fish in the water* – Fish are wandering towards the northern regions due to its colder water as their usual territories grow too warm for them (correct) / Fish enjoy the warmer temperatures and the fish population grows (false)
- *Fishing in the ocean* – Overfishing is one of the main reasons for the declining fish population around the world (correct) / Fish are taken into aquariums to heal and recover (false)
- *Drinking water sources drying out on land* – Competition/demand for water rises around the world (correct) / Artificial water development (false)
- *Warm air takes in more water* – More humid and unbearable heat (correct) / Nice spring temperatures (false)
- *Warm air cools down* (due to taking in more water) – More rain and thunderstorms (correct) / More snow and better snow sports opportunities (false)
- *Less cloud coverage* – More sun/heat on land, land drying out, dying of crops and plants (correct) / Nicer beach weather and sun tanning, more usage of sun cream (false)

Step 2: The trainer reveals the correct answers and provides background information on the scenarios (why does it have this effect?). There is also more information listed on the worksheets themselves.

Step 3: The participants, in their groups, discuss how some of the scenarios might affect them and their daily life directly.

Additional Remarks	-
Online Implementation	If implemented online, the trainer can provide the paper sheets in a file to all participants beforehand, so all participants have the materials when the activity is implemented.

Sources	International Union for Conservation of Nature (IUCN) (n.d.): *The ocean and climate change*. Last retrieved 05.07.2021, <https://www.iucn.org/resources/issues-briefs/ocean-and-climate-change> Environmental Defense Fund (2013): *5 ways climate change is affecting our oceans*. Last retrieved 05.07.2021, <https://www.edf.org/blog/2013/10/08/5-ways-climate-change-affecting-our-oceans>

Activity Nr.	
M5-U2-A3	
Activity Name	My contribution
Activity Type	• Story/Experience sharing • Research activity
Duration	30 minutes
Nr. of participants	Max. 16 participants
Language Level	✓ Moderate ☐ Progressive
Depth of information	✓ Basic (no required background knowledge) ☐ Advanced
Learning Objectives	- Raise awareness of behavioural impact on water consumption and degradation - Learn about ways to improve water quality and availability

Description

Step 1: The trainer splits the participants into groups of max. 4 people. Each group receives an activity sheet separating a paper into four areas: At home / Outside / On the water / Everywhere.

Step 2: The participants are then asked to think about ways to improve water quality and availability through their actions. The actions are then sorted into the four categories.

10 important actions on how to improve the water situation:

- (At home) Reduce pollutants, reduce waste
- (Outside) Shop wisely, reduce vehicle pollution, use less energy
- (On the water) Fish responsibly, practice safe boat transport, respect natural habitat
- (Everywhere) Conserve water, volunteering

Step 3: Each group presents their thoughts and discusses possible differences or similarities in findings.

Additional Remarks	It is recommended that the trainer presents one example for two of the areas to show the participants what they have to do, as well as what the differences between the areas look like.
Online Implementation	If implemented online, the trainer can provide a general sheet all participants can work on online and then go through them with the participants.
Sources	NOAA (n.d.): *How can you help our ocean?* Last retrieved 05.07.2021, <https://oceanservice.noaa.gov/ocean/help-our-ocean.html> Oceana (n.d.): *10 Ways You Can Help Save the Oceans*. Last retrieved 05.07.2021, <https://oceana.org/living-blue/10-ways-you-can-help-save-oceans>

Topic 3: Our Planet Earth – Plants and animals

Humans share planet Earth with more than 8 million other animal species and over 300 000 different kinds of plants, as estimated by scientists. Many of these animals and plants are fundamental in keeping the planet healthy and the ecosystem of the planet running. At the same time scientists estimate that over 20% of plants and over 7000 animal species are considered as endangered due to reasons as climate change and habitat loss. And over 10 thousand species are being watched in fear of them becoming endangered. So, while the number of humans on Earth continues growing, the number of animals and plants is declining, not only endangering the species themselves, but also the planet's biodiversity and ecosystem.

What does it mean to be endangered?

- If an animal species' population has declined between 50-70% in less than 10 years;
- If the animal only has a natural geographical habitat of less than 5000 km^2;
- If the animal species has a population of less than 2500 or less than 250 adults.

Methodology:

Compared to the other topics of Module 5, this topic revolves around research and discovery of the content. The teacher shall guarantee that all participants clearly understood the questions and tasks asked of them and shall then support them in how to implement research and the presentation of findings.

Learning Objectives:

- Become aware of the dangers to animals and plants on planet Earth.
- Learn how to actively contribute to the protection of animal and plant species around the world.
- Be able to identify the dangers of human behaviour for animals and plants.

Learning Materials:

M5-U3-M1

Further Reading:

World Wildlife Fund (2021): *SPECIES DIRECTORY*. Last retrieved 05.07.2021, https://www.worldwildlife.org/species/directory

Learning Activities

Activity Nr.	M5-U3-A1
Activity Name	What is happening to our planet?
Activity Type	• Quiz • Visual Learning
Duration	30 minutes
Nr. of participants	Max. 16 participants
Language Level	✓ Moderate ☐ Progressive
Depth of information	✓ Basic (no required background knowledge) ☐ Advanced
Learning Objectives	- Learn about the effects of global warming on plants and animals - Learn about climate change consequences in an interactive and visual way

Description

Step 1: The participants are split into groups of max. 4 participants.

Step 2: Each group receives 20 cards. Each card pair is made of one card showing a plant or animal and one card signifying the consequences of climate change and human behaviour on it.

Example: Forest > Paper (overproduction of paper).

The participants are asked to sort the card pairs together. On the back of each second card is a short explanation of the effects of climate change, human behaviour and global warming on the first card.

See Additional Material M5-U3-M1

Step 3: The groups come together and discuss the pairs they found. They are asked to discuss the following questions:

- "Is this effect always negative?"
- "How could we prevent/reduce these consequences?"

Additional Remarks	If implemented in a small group of participants, the trainer can also skip step 1.
Online Implementation	If implemented online, the trainer should provide an online resource where the cards can be displayed and enabling the participants to choose and order the cards according to their liking.

Activity Nr.	**M5-U3-A2**
Activity Name	In danger
Activity Type	• Research activity • Discovery Learning
Duration	45 minutes
Nr. of participants	Max. 16 participants
Language Level	✓ Moderate ☐ Progressive
Depth of information	✓ Basic (no required background knowledge) ✓ Advanced

Description

Step 1: The trainer splits the participants into groups of 2-4 people. Each group can choose from the list of endangered animals and plants:

- Rhinoceros: Javan / Black / Sumatran
- Vaquita
- Gorillas: Cross River / Eastern Lowland / Western Lowland
- Tigers
- Elephants: Asian / Sumatran
- Orangutans, especially Bornean and Sumatran
- Hawksbills turtle
- Amur leopards
- Yangtze Finless Porpoise
- Saola
- Bluefin tuna
- Texas poppymallow
- Texabama croton
- Comanche Peak prairie clover
- Puzzle sunflower
- Hinckley oak
- Big red sage
- Bracted twistflower
- Phalaenopsis Micholitzii
- Prickly Cica
- Dracaena Draco
- The Medusagyne
- Sirdavidia Solannona
- Guzmania Lepidota

Step 2: Each group has 20 minutes to research the endangered species according to the following questions:

- "Where is this animal/plant located at in nature?"
- "Why is it endangered?"
- "What consequences does its extinction have on our ecosystem?"
- "How can we prevent its extinction?"

Step 3: Each group presents their findings in a presentation to the whole group (5 mins per group). If any participant has questions or additional information, they can speak up after each presentation.

Additional Remarks	If desired, the difficulty of the activity can be increased by prolonging the research time and adding questions to the research questions.
Online Implementation	If implemented online, the trainer can also sort each participant one plant/animal, depending on the number of participants.

Sources

World Wildlife Fund (2021): *SPECIES DIRECTORY*. Last retrieved 05.07.2021, <https://www.worldwildlife.org/species/directory>

Lady Bird Johnson Wildflower Center (n.d.): *Endangered Plants*. Last retrieved 05.07.2021, <https://www.wildflower.org/project/endangered-plants>

Our endangered world (2021): *21 Top Most Endangered Plants Around the World*. Last retrieved 05.07.2021, <https://www.ourendangeredworld.com/species/endangered-plants/>

Topic 4: Protection and Preservation

Greenpeace, the Paris Climate Agreement, the World Wildlife Fund, everyone has heard or encountered at least one initiative, project or organisation for the preservation of nature. This module revolves around active participation and contribution to such initiatives, how to take part and support, as well as how to find reliable information on such endeavours and properly evaluate their reach, activities and actual impact.

Methodology:

The time frame for activities of this topic are suggestions. The trainer can adapt the duration of the following activities according to the participants' needs and motivation as well as the time frame available for learning. The content and complexity of the research and observation in the activities shall be adapted accordingly by the trainer.

Learning Objectives:

- Learn more about climate protection initiatives worldwide.
- Raise awareness regarding the differences between activities and actual impact on climate protection.
- Be able to conduct a proper and reliable search for information online.
- Identify possible ways to support and contribute climate protection projects.

Learning Materials:

M5-U4-M1

Learning Activities

Activity Nr.	M5-U4-A1
Activity Name	What do you see?
Activity Type	• Discovery Learning • Visual Learning
Duration	60 minutes
Nr. of participants	Max. 10 participants
Language Level	✓ Moderate ☐ Progressive
Depth of information	✓ Basic (no required background knowledge) ✓ Advanced
Learning Objectives	- Raise awareness regarding nature pollution and degradation sources - Learn more about alternative ways to protect nature

Description

Step 1: The trainer and the participants discuss the following questions:

- "How many air conditioning/heating units do you cross paths with every day?"
- "How many light sources do you think you can find which are switched on without being needed? (e.g., while a shop is closed)?
- Etc.

The participants discuss what they would expect to find during a specific time frame.

Step 2: The trainer gives the participants a set time frame (during a training break or until the next lesson). During this time frame the participants are asked to live as usual but count and identify all nature pollution sources, they are able to recognize.

Examples:

- Air condition units, heating units, …
- Light sources which do not have to be switched on 24 hours a day
- Waste dumps
- Unnecessary multiple plastic packaging
- Etc.

Step 3: Once time is up the participants come together again and share their findings with each other. The participants compare their observations with their expected numbers from Step 1.

Step 4: The participants discuss what would be alternative ways instead of the climate pollution sources they found.

Additional Remarks	The trainer can set the time frame freely depending on when they want to implement the observation. This can be conducted during a 1-hour training break during lunch or in the break between weekly lessons. Step 4 can be optional if alternative possibilities have already been discussed beforehand. The trainer can adhere to a basic level of knowledge on pollution sources by giving examples before the observation or let the participants rely on their advanced knowledge on sources and explore the possible sources themselves before discussing them in the group.

Activity Nr.	M5-U4-A2
Activity Name	Preservation and support
Activity Type	Research activity
Duration	60 minutes
Nr. of participants	Max. 16 participants
Language Level	✓ Moderate ☐ Progressive
Depth of information	✓ Basic (no required background knowledge) ☐ Advanced
Learning Objectives	- Learn more about climate protection initiatives and active participation in them - Be able to implement reliable research online

Description

Step 1: The participants are split into groups of 2-4 participants. Each group is then asked to research a climate protection initiative. This can be a project, an organisation, a movement or a foundation on local, regional, national or international level. The participants are asked to provide the following information:

- Name of the initiative
- Reach of activities (local, national, etc.)
- Area of activity (water, waste separation, preservation of species, against climate change in general, etc.)
- Funding & Financials (how do they fund their activities?)
- Implemented activities
- Actual impact and effects of their activities

See Additional Materials M5-U4-M1.

Step 2: After 30 minutes the groups come together, and each group has 6 minutes to present their findings to the other participants. After each presentation the other participants can ask questions on the initiative.	
Additional Remarks	Depending on the capabilities and motivation of the participants, the trainer can adapt the duration of the research and activity to the participants' needs.

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