Climate CO_2cktail

Ingredients for a sustainable footprint

Pedagogical materials
about climate protection and
(adaptation to) climate change
for 15 to 19-year-olds

On behalf of

Federal Ministry
Republic of Austria
Climate Action, Environment,
Energy, Mobility,
Innovation and Technology

A project of

fub
Forum
Umweltbildung

Publisher and owner
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Forum Umweltbildung is an initiative funded by the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology and the Austrian Federal Ministry for Education, Science and Research.
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Commissioned by the Federal Ministry for Climate Action

Federal Ministry
Republic of Austria
Climate Action, Environment,
Energy, Mobility,
Innovation and Technology

Content

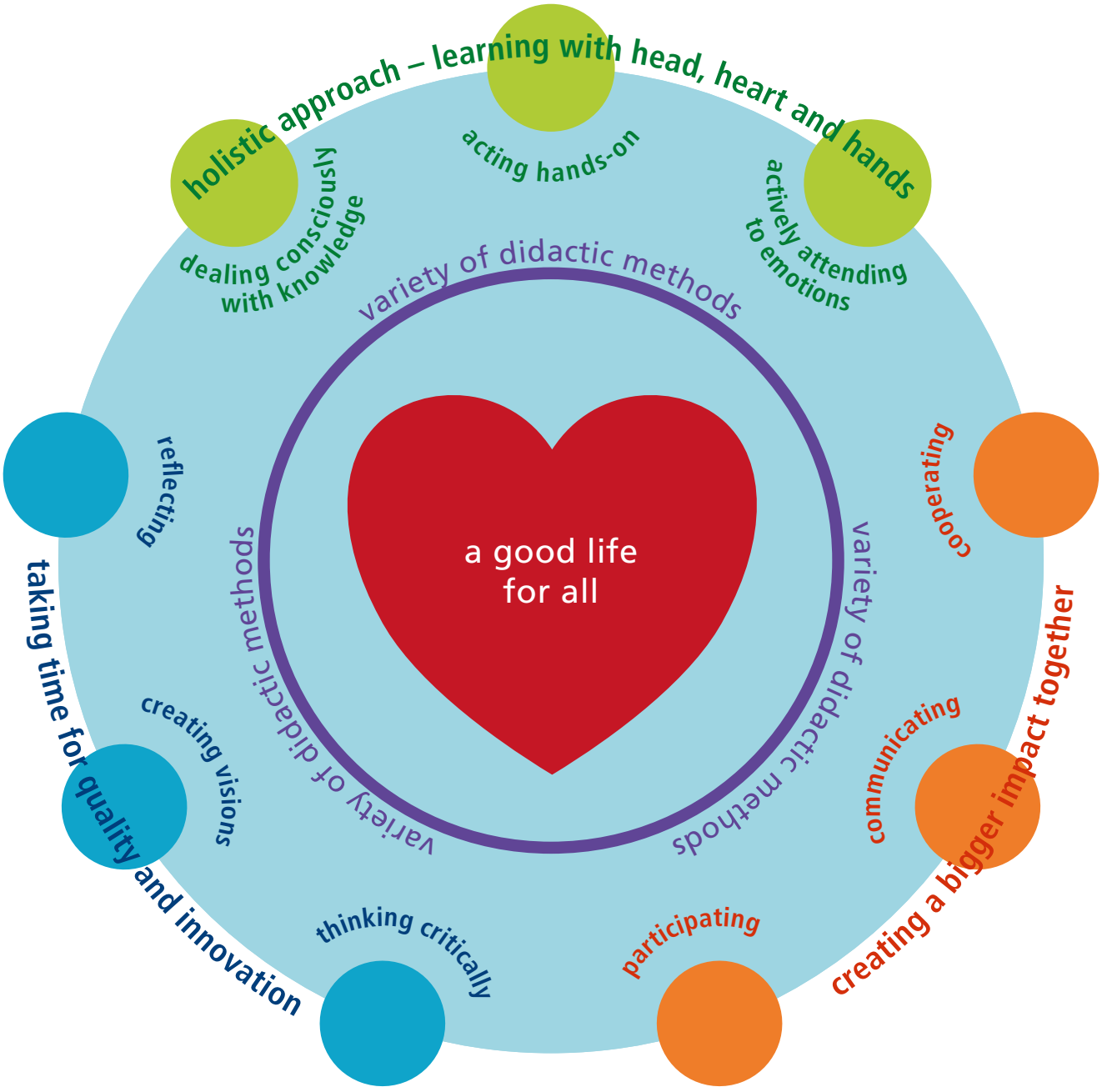
Education for Sustainable Development

This booklet aims to support educators in enabling learners to understand the issue of climate change and its relevance to our society.

In 2015, the 17 Sustainable Development Goals (SDGs) were unanimously adopted by all 193 member states at the United Nations Climate Summit. The United Nations "17 Sustainable Development Goals" (SDGs) cover social, economic, environmental and political issues and aim to transform the world so that all people can live well, now and in the future. Thematically, this booklet is primarily oriented towards **Goal #13: climate action.**

The methods have been created according to the principles of Education for Sustainable Development, with Education for Sustainable Development being anchored under **Goal #4: quality education.** Through the variety of didactic approaches that this booklet tries to convey, learners should be addressed on different levels and thereby acquire competences that are necessary for shaping a sustainable future. Participation and cooperation orientation, the reality of the learners' lives, critical thinking, reflection, problem solving and concrete action as well as the development of visions play an essential role here.

Therefore, in the present material, emphasis was placed on a variety of methods. By describing innovative methods in a way that is appropriate for the target group, young people are given the opportunity to expand their repertoire of possibilities and competencies, in addition to dealing with the content, by getting to know methods and developing them themselves, such as producing videos, conducting interviews, or creating a blog. Valuable learning opportunities therefore arise in independent research, in leading discussions and moderating, in organising events and presenting the results to a selected public. The material at hand provides a variety of suggestions for this.



Graphic: Forum Umweltbildung

Applying this booklet

This booklet for the age group of 15 to 19-year-olds was developed as a didactic basis for teaching and youth work on the following topics: climate change (adaptation), climate protection and carbon footprint.

Due to its flexible module system, the teaching material allows both the study of individual selected topics and the compilation of thematic chains adapted to the group and its interests.

Even within the individual modules, a wide selection of tasks is possible depending on the framework conditions. The exercises and tasks can be expanded at will and according to the situation. The time specifications refer in each case to the minimum amount of time planned. At the beginning of each chapter, the appropriate subjects suggested for each module can be found.

This collection of materials is very well suited for project lessons or projects in extracurricular youth work, where the participants have enough time to familiarise themselves with the topic according to their own interests, and where there is also room for self-activity. If there is no possibility for project lessons, many tasks can also be worked on independently at home.

With these didactic materials we wish an exciting and inspiring journey with these climate change topics!

Forum
Umweltbildung

Climate research

Suitable for

- **Geography and economics**
- **English**
- **Biology and environmental studies**
- **Project lessons – interdisciplinary**

MODULE 1

Content overview for educators

Module 1 is suitable for introducing the topics of climate change and climate protection. The participants should pick up at their current level of knowledge and experience and, building on this, gain new insights into the topic.

Methods used: brainstorming, including processing the results in the group, recording and discussing the current state of knowledge with the help of posters, discussing one's own perception of the topic in the media as well as initial research exercises, and working with texts on the topic of climate research.

How does climate research work?[1]

Climate research is a complicated field in which many different factors have to be taken into account. Measured and reconstructed climate data from the past forms the basis of global climate models, from which future climate scenarios are ultimately derived. Climate researchers obtain this data on the past climate using various methods:

- **Climate reconstruction**
  Direct data on climate change has only been available for a few hundred years. Accordingly, older climate history can only be reconstructed. To do this, we work with so-called proxy data. This is indirect climate data from natural archives (e.g., ice cores or tree rings) or from historical sources, which can help draw conclusions about past climactic conditions.

- **Climate measurement**
  For the much shorter time span from the past couple of centuries to the present, one can fall back on directly measured climate data (e.g., air temperature, precipitation, humidity, wind, ...).

- **Glaciology**
  Fluctuations and trends in climate can also be traced on the basis of ice sheets and glaciers.

- **Climate modelling**
  Global climate models make it possible to estimate the contribution of individual natural and human influences to changes in the Earth's climate system. The creation of complex, computer-based climate models is very time-consuming.

Quality assurance of scientific publications

Climate researchers from Austrian and international institutions (such as ZAMG – the Central Institute for Meteorology and Geodynamics and the IPCC – the Intergovernmental Panel on Climate Change) work in a peer-review process. This means that all research contributions may only be published after a mutual peer review. The information portal of the Central Institute for Meteorology and Geodynamics **zamg.ac.at** also provides more detailed information on the individual research methods.

[1] Source for the entire section: Zentralanstalt für Meteorologie und Geodynamik (n. d.). *Klimaforschung – Der Methodenschatz der Klimatologie.* Last accessed 11/2/2021 at www.zamg.ac.at/cms/de/klima/informationsportal-klimawandel/klimaforschung.

Tasks

15 Min.

- Collect the thoughts that come to mind when you hear the word “climate change” by brainstorming in a slightly different way.

  Go around the room alone with ten small notes each and think about the word “climate change”. Then write each association on a separate piece of paper and just throw it on the floor until all ten pieces of paper are used up.

  Then collect the slips of paper and try to group them – are there different topic groups to which the individual slips of paper or terms and word groups can be grouped? To which groups of topics are there many contributions, and to which are there fewer? Can you see a tendency from all the contributions or associations as to what the attitude to climate change looks like (perhaps rather optimistic or pessimistic, emotional or indifferent, ...)?

  Briefly discuss the contributions or your associations with climate change in the group.

30 Min.

- You regularly hear or read reports and information about climate change that provide very serious scenarios for the future. But also sceptics speak out continuously, who doubt the alleged facts or play them down.

  Scrape together your knowledge about climate change: which facts do you think are correct and certain, and which are not? Why? Write your statements on a poster and arrange them in three columns:

Facts	**Assumptions** (uncertain knowledge)	**Nonsense** (certainly not true)
1.	1.	1.
2.	2.	2.
3.	3.	3.
...	...	...

When listing facts about climate change, briefly argue why you think this information is correct and establish agreement in the group. Only facts that are accepted as such by the majority will go in this column. You may be surprised at how many supposed “facts” you have to put in the “uncertain knowledge” column. Don’t be discouraged, and at the end of the brainstorming session, divide the listed assumptions among yourselves. Then spend 15 minutes researching on the internet and try to convert as many of the assumptions as possible into facts so that this column grows by the end. Hang up the poster in the room. You may find it interesting after some time dealing with the topic to see where your starting point was in climate change knowledge.

20 Min.

Very often you can find articles about climate change in newspapers or magazines. Collect different articles online and summarise the facts from each one. You can work in pairs on one article at a time and then present the facts to each other. Search in categories such as "ecology", "nature" or "knowledge" or enter suitable keywords in the search field.

Then examine the articles for the following points and compare them:

- What consistent statements can you find in the various articles?
- Are there also points where individual articles contradict each other?
- If you find such points: which article are you more likely to believe and why?

20 Min.

Research some more information from the internet. For example, go to the website **metoffice.gov.uk/climate-guide** and answer the following questions:

- How is knowledge about climate gained?
- Who or which institutions conduct research on climate in Austria?
- Which climate data can be measured directly?
- How can we gain knowledge about the climate of past centuries?
- How does peer review work and what is the point?

Further research links on the topic of climate research

- Tyndall Centre for Climate Change Research
  Tyndall.ac.uk
- United States Environmental Protection Agency
  Epa.gov
- Climatic Research Unit at the University of East Anglia
  uea.ac.uk/climate

A changing climate

Suitable for

- **Geography and economics**
- **Chemistry**
- **Biology and environmental studies**
- **English**
- **Arts education**
- **Project lessons – interdisciplinary**

MODULE 2

Content overview for educators

Module 2 deals in detail with the topic of the greenhouse effect. The participants are to work out comprehensive information themselves and pass on their knowledge. Through creative approaches, the acquired knowledge is to be reflected and experienced holistically.

Methods used: internet research, work with an animated film, discussion of own opinions, examination of cartoons and own creative design. The preparation of the acquired information as well as the presentation of the resulting products are methodically instructed in different and varied ways in this and the following modules.

Climate change or climate emergency?

The term "climate change" is often used, including in this booklet. However, there are increasing doubts as to whether this term reflects the current state of affairs. There is criticism, for example, that the term sounds neutral and passive, since "change" can occur both positively and negatively, and thus plays down the dramatic consequences that climate change entails. Accordingly, the term "climate emergency" is often used, especially in a political context, as this term presents the impending effects more obviously. The same applies to the term "global warming", as warmth is usually associated with something positive. Here, the phrase "global heating" would probably be more accurate. Even if not everyone in the field of climate journalism agrees, the choice of words should not be underestimated, as it has a decisive influence on people's thinking.[2]

How is the greenhouse effect created?

Greenhouse gases are the most significant cause of climate change. The anthropogenic greenhouse effect causes the average temperature of the earth's surface to rise, with serious consequences for our environment, our economy and our society.

But how does this greenhouse effect come about? The earth's surface radiates reflected sunlight in the form of heat. Since our atmosphere is partially permeable to heat radiation, only part of the heat is immediately radiated into space, while the rest remains behind and increases the temperature at the Earth's surface. The global average temperature is +15 °C due to the natural greenhouse effect.[3]

Without this natural greenhouse effect, the average global temperature would be about –18°C. At present, however, humans are very successful in amplifying the natural greenhouse effect. This man-made (anthropogenic) greenhouse effect is caused by the emission of greenhouse gases, which reduce the permeability of the atmosphere for heat radiation. The heat radiation emitted at the Earth's surface can thus only be emitted into space to a lesser extent, which in turn causes the average temperature of the Earth's surface to rise. 3 Greenhouse gases are produced, among other things, by the combustion of fossil fuels, in agriculture and forestry, in industry, and in the landfills.[4]

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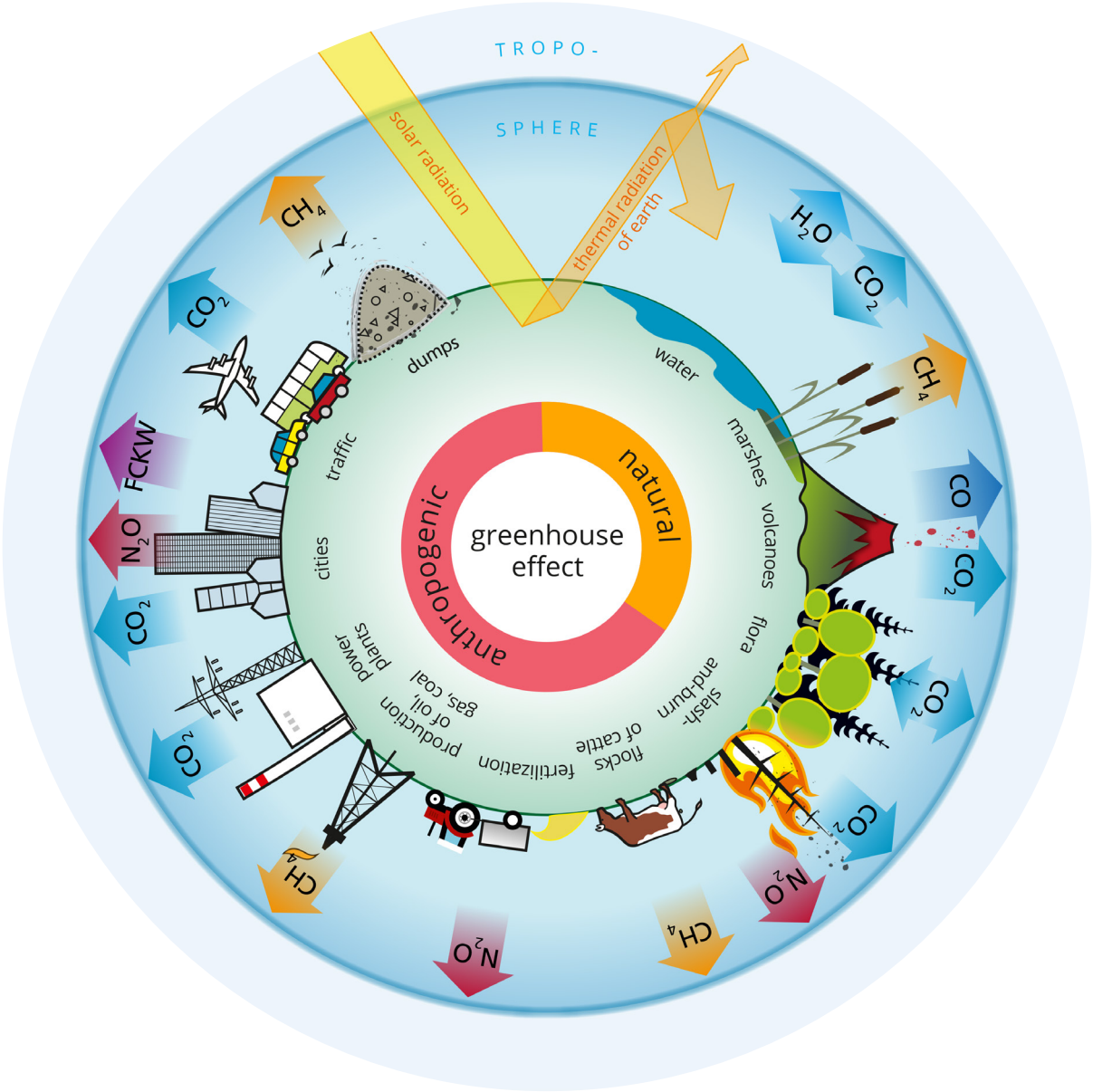
2 Source: Boss, S. (2016): *Warum die Klima-Erwärmung eigentlich eine Klima-Erhitzung ist.* Last accessed on 11/2/2021 at tageswoche.ch/gesellschaft/warum-die-klima-erwaermung-eigentlich-eine-klima-erhitzung-ist.

3 Source: Umweltbundesamt (2013): *Wie funktioniert der Treibhauseffekt?*. Last accessed on 11/2/2021 at www.umweltbundesamt.de/service/uba-fragen/wie-funktioniert-der-treibhauseffekt.

4 Source: Umweltbundesamt (2020): *Die Treibhausgase*. Last accessed on 11/2/2021 at www.umweltbundesamt.de/themen/klima-energie/klimaschutz-energiepolitik-in-deutschland/treibhausgasemissionen/die-treibhausgase



Natural greenhouse effect

Carbon compounds and water vapor in the atmosphere act like the panes of a glass house. They let light through, but partially prevent heat dissipation into space.

Anthropogenic greenhouse effect

With the enormous quantities of greenhouse gases that humans are releasing, the natural regulatory processes are getting out of balance. The more the greenhouse effect is intensified, the more the temperature at the earth's surface rises.

Carbon cycle

Natural mechanisms regulate the breakdown and build-up of greenhouse gases. The atmosphere, oceans, vegetation and soils absorb approximately as much CO_2 as they release.

Greenhouse gases

CO	*Carbon monoxide*
CO_2	*Carbon dioxide*
CH_4	*Methane*
H_2O	*Water*
N_2O	*Nitrous oxide*
CFCs	*Chlorofluorocarbons*

The global temperature has already risen by about one degree since before the start of industrialisation. Although this may not sound like much, even a small increase in the global temperature mean cause strong changes: Compared to the glaciation before approx. 21.000 years, the global mean temperature of today's climate has only risen by about 4 °C to 5 °C higher.[5]

In order to predict the development of the global climate, four so-called RCP scenarios were developed for the fifth assessment report of the Intergovernmental Panel on Climate Change (IPCC). These include a mitigation scenario (RCP2.6), two stabilization scenarios (RCP4.5 and RCP6.0) and one scenario in which greenhouse gas emissions continue to rise unchecked (RCP8.5). The respective values of the RCP scenarios represent the change in the Earth's energy balance. By the end of the 21st century, the Earth's average temperature is expected to rise by at least 1.5 °C, and according to the RCP8.5 scenario, a global temperature increase of 4.8 °C compared to pre-industrial levels is also possible if no efforts are made to reduce emissions.[6]

Are humans the sole cause?

There are also natural causes for the current climate change. Climatic changes are known to have occurred even before humans caused them. This is well documented by the example of the ice ages. The natural causes include on the one hand internal climate fluctuations (e.g., caused by the oceanic circulation and its interaction with the atmosphere or by fluctuations in the circulation of the atmosphere itself) and, on the other hand, external forcing factors (e.g., fluctuations in solar radiation or volcanic eruptions).[7]

However, the majority of climate scientists believe that humans are the most significant cause of current climate change. The fifth assessment report of the Intergovernmental Panel on Climate Change (IPCC) states that the influence of humans is responsible for the current climate change with 95 percent certainty. The concentration of various greenhouse gases (CO_2, CH_4, N_2O) has been increasing alarmingly since 1750 due to human activities. In the future, there will be a worldwide increase in temperature, and people's ways of acting will reinforce this effect.[6]

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5 Source: Global 2000. *Globale Folgen des Klimawandels.* Last accessed 11/2/2021 at www.global2000.at/folgen-des-klimawandels.

6 Source: IPCC (2013): *Zusammenfassung für politische Entscheidungsträger*. In: Klimaänderung 2013. Naturwissenschaftliche Grundlagen. Beitrag der Arbeitsgruppe I zum Fünften Sachstandsbericht des Zwischenstaatlichen Ausschusses für Klimaänderungen (IPCC). Deutsche Übersetzungen durch Deutsche IPCC Koordinierungsstelle, Österreichisches Umweltbundesamt, ProClim, Bonn/Wien/Bern, 2016.

7 Source: Bildungsserver. *Natürliche Klimaschwankungen.* Last accessed on 11/2/2021 at wiki.bildungsserver.de/klimawandel/index.php/Nat%C3%BCrliche_Klimaschwankungen.

Tasks

- Find out as much as possible about the greenhouse effect on the internet and create a quiz: think of ten knowledge questions. Then exchange your self-made quizzes with each other and answer them.

30 Min.

- Explain to the person sitting next to you in your own words how the greenhouse effect works and try to support the explanation with a quick sketch.

10 Min.

- **Global Warming – None Like It Hot!** – A slightly different explanation of the greenhouse effect. Watch this short film together on YouTube and share your thoughts about it. What do you think of the film? What do you think of this kind of humor? Think about whether you have seen or heard any campaigns, adverts or songs that deal with climate change. Which ones come to mind?

15 Min.

- Research cartoons and/or caricatures on the topic of climate change on the internet and briefly discuss them. You can find examples of this under:

  - **seppo.net**
  - **liveabout.com** (search for: “climate change”)

  What do you think of the examples you found (funny, not funny, thought-provoking, successful or not, ...)? Print out the cartoons or caricatures you have found, place the printouts on the floor, walk around and look at them. After about two minutes, choose a picture that particularly appeals to you.

  Now briefly describe your cartoon/caricature to the others and answer the following questions: why did I choose this picture? What appeals to me about it, and what irritates me? What thoughts do I have about it? What associations?

20 Min.

- Discuss in class: what do you think about the possibility of expressing information or thoughts about climate change in a creative way? Do you think that people can be reached in this way, or is it better to approach the matter seriously and objectively?

  What other ways can you think of to approach the topic with humor and still get information out to people?

10 Min.

30 Min.

Draw small cartoons, comics, humorous sketches or design campaign posters and slogans that convey information about climate change or messages for climate protection. You may want to get feedback from others and develop them further. If your work is really successful, you can photograph it and put it online or reproduce it and share it at school or with youth groups.

Project lessons

Don't let the valuable information that you have already collected with a lot of commitment (and also the information that you will still work on) disappear unused in a drawer, but continue to use it by making it available to other interested people! By informing other people you also contribute to climate protection. For example, hang up your posters at school or post photos of them online. You can also create your own magazine or blog on climate protection, open your own social media channel or shoot a short video and publish it on YouTube. There are no limits to your creativity here, the main thing is that you enjoy doing it and motivate other people to take a closer look at the issue. In the following modules you will find various suggestions for presenting information in an interesting way.

Tips for educators

- Facts about the climate emergency
  unep.org
- 10 myths about climate change
  wwf.org.uk
- Video on YouTube
  Global Warming and Climate Change explained

Climate change has consequences

Suitable for

- **Geography and economics**
- **Biology and environmental studies**
- **English**
- **Psychology and philosophy**
- **Project lessons – interdisciplinary**

MODULE 3

Content overview for educators

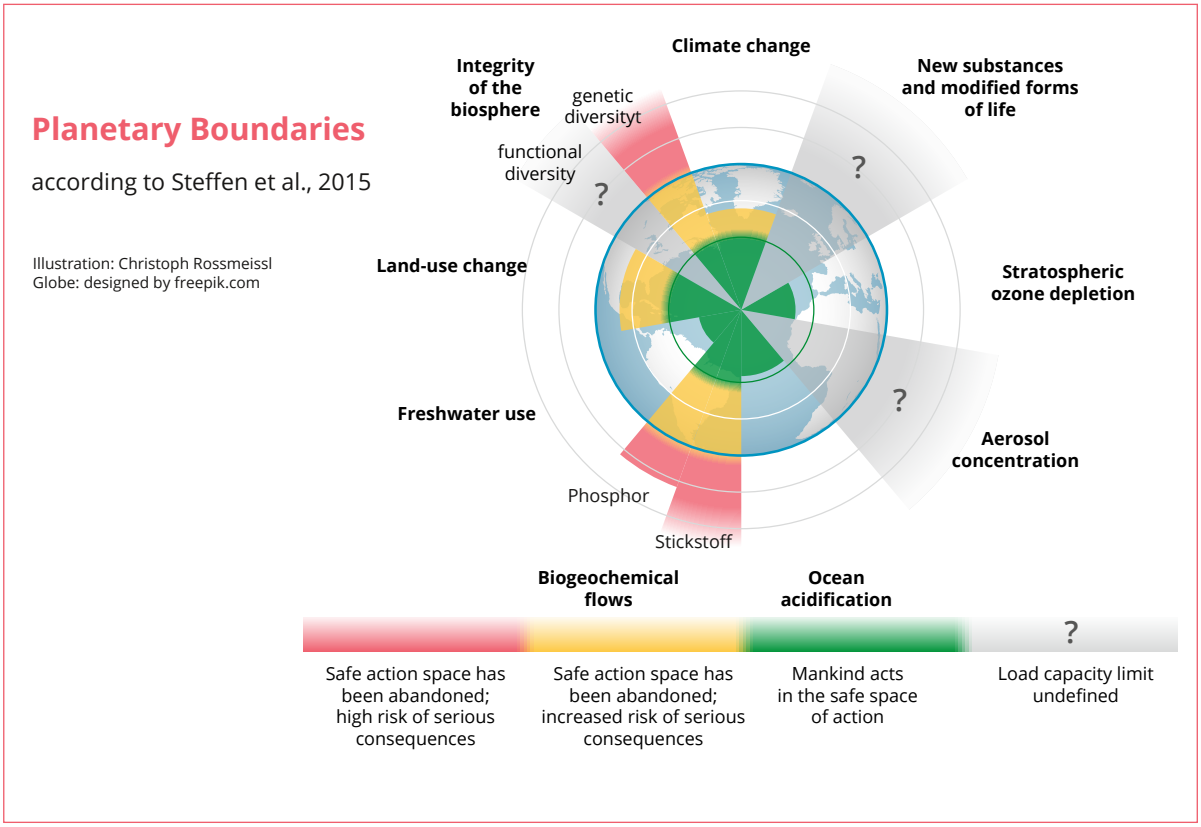
Module 3 deals with the effects of climate change on people and the earth. In a first phase the information is to be acquired, in a second phase the focus is placed on a future-oriented, positive approach to the topic. The participants are encouraged to develop visions for the future and possible solutions.

Methods used: discussion about own experiences, work with newspaper articles, internet research, brainstorming on future visions and solution ideas, and creating a blog or social media accounts (Twitter, Instagram, etc.).

Global warming as a result of climate change has consequences![8]

Our environment cannot adapt to climate change to the extent that the rapid increase in the anthropogenic (man-made) greenhouse effect would require. This could have devastating consequences for the whole of humanity – in ecological as well as in economic and social terms.

Changes in the water balance, the ecosystems on the land and those in the water will be expected. Rising sea levels will affect millions of people in coastal regions. Glaciers and ice caps will continue to melt. Agriculture and Food supply will be affected as well as human health.



Under the leadership of Johan Rockström, a team of scientists published an article on the ecological limits of the Earth in 2009, which was supplemented in 2015. The graphic above illustrates which of the nine key environmental problems are still within a controllable range (green area) and which are already in a risk area (yellow and orange areas). What is not very clear in the diagram are the interactions that prevail between the individual hazard areas.

[8] Source for the entire section: Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (n. d.). *Planetare Belastbarkeitsgrenzen.* Last accessed 11/2/2021 at www.bmu.de/themen/europainternationales-nachhaltigkeit-digitalisierung/nachhaltige-entwicklung/integriertes-umweltprogramm-2030/planetare-belastbarkeitsgrenzen/.

Tasks

- Think for a moment on your own: have you already felt the effects of climate change in your own life? What were they?

  Share your experiences. What changes can you really say are due to climate change, and which are you not so sure about? Why?

15 Min.

- Surely each of you has noticed so far that climate change is present in various reports on television, radio, internet, newspapers and magazines. Collect newspaper reports, print information from the internet and cut out pictures about climate change from magazines or newspapers. Collect as much as possible and sift through your material or arrange it according to different areas: e.g., effects in Austria, Europe or worldwide. Also mark which articles or pictures you think are serious and which ones you think might not be objective (e.g., exaggerated, understated, very emotional, ...).

30 Min.

- Find out about the effects of climate change on the internet. Websites of NGOs, knowledge magazines or official institutions can be helpful. Divide into four groups and choose one of the four areas:

  - Impacts on terrestrial and aquatic ecosystems
  - Effects on the ecosystems of the Alpine regions
  - Impact on agriculture and food supply
  - Effects on human health

  Work out the most important facts of your area and prepare them (e.g., with posters, a PowerPoint presentation or perhaps very creative ideas) so that you can then present your area to the other groups.

  Present your results and findings to each other.

  The following websites can help you with your research on the internet:

  - **nationalgeographic.com**
  - **wwf.org.uk**

40 Min.

50 Min.

You have probably already noticed that it is advantageous to look at several sources of information on the topic of climate change in order to obtain comprehensive information. Do more research on different sites than you have done so far on the same topic. Among other things, you can find more facts about climate change at the following links:

- **bbc.com**
- **climate.nasa.gov**

Videos can also serve as a source of information. An example of a short video (9:05 min.) under the name **"Global Warming"** can be found on the YouTube channel of Lindau Nobel Laureate Meetings.

50 Min.

Based on the knowledge gained so far about climate change, you should now try to look into the future in small groups: what will the world look like in 2100? This method allows you to combine alternative ideas about positive and negative developments in the future into concrete scenarios. The guiding question in this exercise is: "What if ...?"

At the beginning of the paper, briefly state the facts about the current (state of knowledge) of climate change and write them down in your group (preferably on a large poster): which things are already changing due to climate change, which are (still) unchanged?

Then set up two scenarios one after the other in a joint conversation:

1. The crying face of the climate future: what the world might look like in 2100, when the worst fears of climate change come true? In which world and in what way will your children and grandchildren live?
2. The smiling face of the climate future: what the world could look like in 2100, when all hopes and visions come true? In which world and how will your children and grandchildren live?

Depict each of the two scenarios pictorially – you can create a poster or a collage (from the previously collected media reports and pictures), paint the scenarios, pantomime them or depict them as a statue from the members of the small group or set the scene with sounds or music. There are no limits to your imagination and your possibilities of expression.

Afterwards, create a small (permanent) exhibition out of your works. Transient works such as pantomimes can be photographed for this purpose. Let the works of the other groups affect you.

30 Min.

- Afterwards, meet again in the small groups and brainstorm together several ideas on two questions: what can we do so that our fears do not come true? What can we do so that our hopes become reality?

  Collect your ideas in plenary and list them on a poster. When you have recorded all the ideas, go through them again and mark them with three colours:

  Purple for: This measure is very easy to implement by any person and immediately.

  Blue for: This measure requires patience and the assistance of other people.

  Yellow for: This measure can only be implemented by politics or business (here you can possibly consider whether and how you can initiate such measures - e.g., collect signature lists, contact regional politicians, write articles or letters to the editor).

  Agree on three actions that you will implement over the next four weeks and start there.

Project lessons

- Document your own experiences and the knowledge you have gained. Feel free to use social media, such as a Twitter or Instagram account. There are no limits to your creativity.

  With the tasks and information on the following pages, you can always add to your reports. A blog or social media account can also be run by the whole class or group, with everyone reporting their own experiences on a particular topic or by dividing topics between different people. It will definitely be interesting for other people what you are doing in the world of climate protection.

  For inspiration, research social media profiles on this topic on various channels or check out different blogs.

TIP: How do we blog properly?

Blogging is an art in itself. You write to be read. How do you do that? Well, there's no recipe for that, but maybe a few tips:

- Write about what interests you.
- Short sentences, active language and direct speech make the text exciting.
- Structure your thoughts. Always ask yourself what your readers don't know and what you want to convey to them.
- Pay attention to the length of your posts. There are texts that are too long and texts that are too short. Your blog is not a text message, you can certainly fit more than one paragraph of text. However, it is not the right medium for an epic work on the scale of "The Lord of the Rings". Rule of thumb: good blogposts fill half to a full screen.
- Proofread your blog posts before you publish them. For longer articles, it's best to take at least an hour break before proofreading.

You can find technical instructions on free blog opportunities at:

- **theblogstarter.com**

Free blogs:

- **creativebloq.com ("The 12 best free blogging platforms")**

Climate change adaptation

Suitable for

- **Geography and economics**
- **Biology and environmental studies**
- **English**
- **History and Social Studies/Political Education**
- **Project lessons – interdisciplinary**

MODULE 4

Content overview for educators

Module 4 provides information and knowledge on the topic of climate change adaptation and the corresponding measures and strategies at regional and global level.

Methods used: text work, internet research, elaboration of information in small groups with poster design, reflection in the group, creative documentation.

How to adapt to climate change[9]

The consequences of man-made climate change are already being felt today: for example glaciers and permafrost are melting, causing rocky slopes in mountainous areas to become unstable, extreme weather events such as floods and droughts are increasing, and the number of hot days and temperatures are rising. But climate change continues to progress and in the future the effects are likely to worsen. Even a drastic reduction in emissions cannot change this, as the inertia of the climate system is responsible for a continued warming. Accordingly, a contemporary climate policy must be based on two building pillars: in addition to the drive to reduce greenhouse gas emissions, there will be increasingly necessary to develop and implement strategies for adaptation to climate change. However, measures to adapt to climate change must never be in contradiction with those of emission reduction and vice versa.

Climate change adaptation aims to reduce the risks and damages (to people, ecosystems and economies) from current and future climate change impacts. There are many ways of adapting to climate change, ranging from awareness-raising to political and environmental measures to technological measures. For example, varieties that are more resistant to drought can be used in agriculture, or water-saving tillage systems can be introduced. A reduction in soil sealing and additional greening on roofs or facades can also be useful. Raising awareness among citizens – for example on the topics of efficient water use or energy conservation – is also an important measure.

At the same time, however, any opportunities that arise as a result of climate change can be used positively. For example, the increasing heat in cities can shift tourism to the alpine region. Climate change also makes it possible to grow some products in new areas. Companies can also benefit by investing in areas such as renewable energy or mobility, closing market gaps or creating new jobs. Early adaptation is necessary for all scenarios in order to be able to exploit the opportunities accordingly.

[9] Source for the entire section: Bundesministerium für Nachhaltigkeit und Tourismus (2018): *Warum wir uns an die Folgen des Klimawandels anpassen müssen.* Ein Argumentarium. Eigenverlag: Wien.

Tasks

- Have a look at the page "Climate change consequences" on the website of the European Commission **ec.europa.eu** and then think together: Which consequences of climate change do we have to expect already now (even if serious climate protection measures curb further climate change)? List these consequences and consider for yourself what measures can be taken to adapt to them or mitigate them. For example, one response to the higher room temperature caused by hotter summers could be to install window shading devices.

30 Min.

- Research on the internet: In which areas are climate change adaptation measures necessary? Which measures are proposed? Create a similar grid yourself on a large poster and fill in the fields with the information gained and your own reflections:

30 Min.

Example: Housing and construction

Area	Consequences of climate change	Possible adaptation measures
• Housing and construction	• Higher temperatures in the summer months – more need for cooling in homes • ...	• Passive cooling (e.g., shading devices) • Alternative cooling technologies (e.g., through ventilation technology – cooling the supply air via the ground) • ... **Important:** *Air conditioning systems contribute to further CO_2 emissions due to their high energy demand and are not suitable as climate change adaptation measures!*

Work in small groups, dividing up the different areas (e.g., Housing and construction, health, agriculture, ...) that you have identified during your research. At the end, present your findings to each other and discuss them.

- Climate change adaptation is a long-term process whose success is characterised by the continuous development of knowledge and the implementation of lessons learned. Find out about your country's policy plans and strategies developed for climate change adaptation, e.g., for Austria on **bmk.gv.at/en** (search for "Austrian Strategy for Adaptation to Climate Change").

30 Min.

50 Min.

Since countries of the South often lack the financial resources for prevention and lack adaptation options, the population there is particularly strongly affected by the impacts of climate change. Especially there, the topic of adaptation measures is very important. Find out more about the topic of "climate justice", e.g., at **un.org** (Climate Justice) or **nationalgeographic.com** (Inequality is decreasing between countries – but climate change is slowing progress).

The YouTube video **"UNHCR expert on climate change and forced displacement"** (3:40 min.) also provides information on this topic.

What climate impacts are occurring in countries of the South? What problems exist in the development and implementation of adaptation measures?

20 Min.

After getting an overview of the difficulties of climate adaptation strategies for the countries of the South, put yourself in the position of a person based in the global South. Write a letter to the public. Where do you see problems? What support would your country need? What suggestions do you have?

Via the keyword "climate witnesses" you can find short video messages on the internet or profiles of people affected. Watch a few of these videos and read some of the texts.

10 Min.

Gather in the group and take a short time to share your mood. Take turns to write a short "weather report" in which you express your personal weather situation in one sentence (e.g., "The sun is shining because …", "I see thick rain clouds …") and describe how you are feeling and why or what is bothering you. Is the overall mood in your group more optimistic or depressed? Briefly discuss the situation and what you can do.

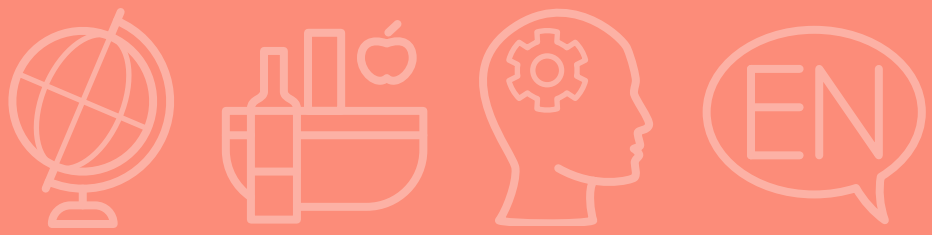
Project lessons

Document your mood and the context of your engagement with the impacts of climate change. Prepare all the information you have worked out so far (blogs, Instagram stories, wall newspapers, freecards, podcasts, small videos, lectures, …) and make it available to other people (the school, the community, other youth groups, parents, …). Think of your own possibilities – information is also an important contribution to climate protection!

Plan individually

Search the internet for experts and invite them to your school. Let them tell you more about the topic in a lecture, deepen your knowledge and get to know new possibilities for action.

Carbon footprint: we leave traces



Suitable for

- **Geography and economics**
- **Household economics and nutrition**
- **Psychology and philosophy**
- **English**
- **Project lessons – interdisciplinary**

MODULE 5

Content overview for educators

In Module 5, the term “carbon footprint” is elaborated. With an online tool, the own greenhouse gas emissions can be determined, background information can be compiled and measures for saving greenhouse gases can be found out. By dealing comprehensively with the topic and attempting to roughly estimate the emissions of products, the participants should get a feeling for the areas in which few or many emissions are produced and where relatively simple and efficient savings measures can be taken.

Methods used: examination of one’s own CO_2 emissions in individual and group work, use of an online tool, internet research, writing a letter to oneself and joint kilometre breakfast.

What is the carbon footprint?[10]

Rising CO_2 emissions are considered to be the main cause of global warming, and every of us can influence how high our own contribution to CO_2 emissions is.

The CO_2 footprint (also known as the carbon footprint) provides information on how many greenhouse gas emissions (including CO_2, methane, nitrous oxide; see also chart on page 13) occur in the entire life cycle of a product or service. For this purpose, the unit under investigation is precisely defined, for example the packaging for 500 grams of a product or the office operation in one year. The carbon footprint can also be determined for the personal lifestyle per year.

For the determination of the footprint, the effects of the so-called life cycle phases taken into account separately: production including raw material extraction, processing, transport and trade, as well as recycling and disposal leave CO_2 traces in the atmosphere. If emissions are avoided through use, reuse or recycling of a product or service, this is deducted from the CO_2 balance as a credit. The result of the footprint analysis is, roughly speaking, a certain amount of CO_2 equivalents in kilograms or tons.

Although the carbon footprint was derived from the ecological footprint, it must be distinguished from the latter because the ecological footprint is broader. It describes the total area needed to maintain a person's standard of living and, in addition to the agricultural area for growing food, also includes, for example, the areas needed for energy production and the sequestration of the carbon dioxide released.

[10] Source for the entire section: Wikipedia (2021): *CO2-Bilanz* Last accessed on 11/2/2021 at de.wikipedia.org/wiki/CO2-Bilanz.

Tasks

- Think briefly about where you cause CO_2 in your life. Make an exact list.

  Compare your lists with each other. What have you included? Can you identify different areas (e.g., housing, mobility, consumer behaviour, etc.)? Sort the items on your list and add to them accordingly if you notice that you have forgotten certain areas.

15 Min.

- Try to estimate the carbon footprint of a product using the following method (keep in mind that this can only be a rough estimate – identifying the precise CO_2 emissions of a product requires meticulous research and complex calculations). Agree on a product of which you know roughly how it is produced and answer the following questions: What materials does the product mainly consist of? Where was it produced and how was it transported? Can the product be recycled? Write down the most important stages that the product goes through in its production (orient yourselves using the life cycle phases indicated above).

  Now assign school grades from 1 to 5, where 1 means no CO_2 emissions and 5 means a lot of CO_2 emissions. Now estimate the CO_2 emissions for each life cycle phase of the product and give a mark for each phase – some research and joint thinking and discussion can make this task easier. Take stock at the end. Does the chosen product have a rather high or rather low carbon footprint?

  Are there comparable products that have a lower carbon footprint (possibly products from the region, e.g., if the transport route is omitted or if a different raw material is used, ...)? Would you have disadvantages if you buy the comparable product with the lower carbon footprint? Think and discuss.

30 Min.

- With a CO_2 calculator, you can make your own CO_2 emissions visible and get an overview of the consequences of different patterns of behaviour and consumption.

  The WWF CO_2 calculator takes into account the categories “Food”, “Home”, “Travel” and “Stuff”. In the “Methodology” section you will find information about which factors are taken into account in each category.

  How consciously do you shape your consumption and mobility behaviour and how sustainably do you live? Calculate your carbon footprint and compare the results.

  - **footprint.wwf.orf.uk**

15 Min.

20 Min.

On the results page you will find general tips on climate protection measures. In addition, think about personal climate protection measures that you can derive from your results in the three areas and your overall result. Discuss in your small group how you can implement these measures. Choose three measures that you can easily implement and write them down. Use the calculator to test the effects of implementing these three measures and work out how much CO_2 you will save.

15 Min.

Write a letter or email to yourself: describe the three actions, that you have chosen and their effect. How will you feel if you follow through for three months? Describe briefly and also leave words of praise for persevering for so long. Put the letter in an envelope, address and stamp it. Find a volunteer from your group to collect the letters and agree to reliably post them in a mailbox in three months.

30 Min.

Divide into four groups (food, travel, home, stuff). Each group now deals once again with the respective chapter in the CO_2 calculator and researches the background information for their respective chapter. Answer the questions: Where are the challenges? And what solutions are there?

Hold a conference. Each subject group gives a short presentation about the researched information. The audience listens and then asks critical questions, e.g.: what are the difficulties in the solutions? What is the best way to implement them?

Plan individually

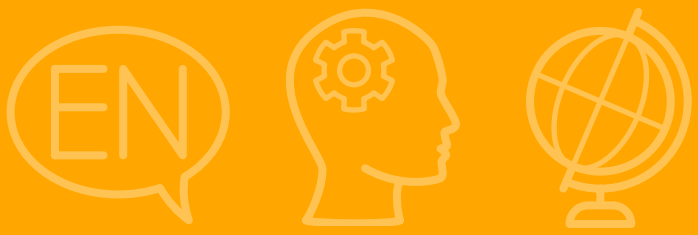
Think about what you have eaten for breakfast today and make a small list. Then write down where the individual products come from or where they were produced. You may have to look at the packaging to do this and can only complete the list at home in the evening. Use **distancr.com** to find out approximately how long each transport route is. Then add up all the distances and compare which breakfast has covered the most miles.

Then plan a breakfast together in class or in your group and collect your wishes on a shopping list. Divide up the errands or go shopping together. Try to “buy” as few transport kilometres as possible. But also consider the CO_2 emissions caused by other activities (e.g., cooling and storing apples from autumn to spring or heating greenhouses for tomatoes in April, ...). You can look online for a sustainable food guide to help you with this. Of course, you may not want to give up some things and have to watch your wallet at the same time.

Share your shopping experiences over a leisurely breakfast in class: was it difficult to buy tasty and inexpensive food with a small carbon footprint? Did you also consciously do without certain things? Did you get to know new products? For which products was it easy to find a similar one with a smaller carbon footprint?

At the end, calculate how many miles your breakfast traveled this time.

My contribution to climate protection



Suitable for

- **English**
- **Psychology and philosophy**
- **Geography and economics**
- **Project lessons – interdisciplinary**

MODULE 6

Content overview for educators

Module 6 deals with the question of how and what each individual can contribute to climate protection. The participants learn about different possibilities and are encouraged to think about and implement measures for their own everyday life. In Module 6, the participants are encouraged to develop their own ideas. Through discussion opportunities on different (extreme) positions, the participants are given the opportunity to form their own opinions.

Methods used: short film, world café, use of an online tool, discussion about own habits and actions, text work and discussion, initiating a school project, thought experiment, conducting an interview.

Climate protection starts with us!

The actual goal of climate protection is to reduce anthropogenic (human-caused) climate change. Climate change, but also climate protection, starts with each and every one of us. One's own consumption behaviour, eating habits and the amount of energy that each person consumes directly influence the climate. Every citizen can normally support or reject state, company or local measures. The sum of all people's decisions makes up climate change and thus also forms the basis for climate protection measures.

Tasks

60 Min.

But what can be done to protect the climate and stop climate change? And above all: who should do something? Take a look at YouTube as a start.

Watch the video **"Climate Change: Your carbon footprint explained – BBC News"** together. Afterwards, discuss questions about climate protection in a world café: just like in a coffee house, people philosophize at tables, discuss and look for solutions together. Spread four to five tables around the room, each with four to eight armchairs, cover the tables with wrapping paper and have pens ready. You can provide drinks and snacks on the tables.

Each table is assigned a topic to be discussed there:

1. Climate protection concerns each and every one of us! What can individuals do? What can society, politics and the economy do? Does it make a difference if everyone implements "small" measures, or do strategic decisions in politics and business lead to the goal?
2. Discuss and share your opinions on the following quote, "Should I give up my full bath? Look at the energy consumption of many industries – I can heat my bath water for centuries for that!"
3. Everyone has the right to a car! Can and should this apply to all people in the world? What would it mean for the climate if all people drove as much as in Europe or the USA?
4. What things or habits could you or would you not do without? Why not?
5. Discuss the YouTube video you have seen by asking the following questions: What do you think of it? Do you think the video is funny or not? Why (not)? What could be discussed? What do you think of this way of conveying information?
6. Depending on the number of participants, you can also offer a "table without a topic" – at this table you simply choose a topic yourself that is on the tip of your tongue.

Now appoint a host for each table. As the host, you are responsible for welcoming the guests in each new round and briefly informing them about what the table is about. As guests, you can visit three tables of your choice in the World Café in three rounds of 15 minutes each. In each round, you discuss the corresponding topic and write your ideas and arguments on the wrapping paper. Each change between the rounds can be introduced by an acoustic signal. As the host, you remain seated at your table and welcome the next guests. At the end of the World Café you report to the whole group about the results and discussion contents at your table. You can then hang up the sheets of wrapping paper from the individual tables as a wall newspaper.

- Based on the results of the CO_2 calculator at **footprint.wwf.org.uk**, think together: in which areas can you save CO_2 and thus reduce your personal emissions? In which areas can this be done most efficiently (greatest possible CO_2 savings with almost the same level of comfort and costs)? How would you like to live and how can this be reconciled with a CO_2-neutral lifestyle? Which things and habits, which hobbies do you not want to do without? Which activities could you possibly make more CO_2-friendly?

40 Min.

- Carry out a thought experiment: "My life without CO_2 emissions". Could you do this and go on with life as before? Is there a way that you can live a normal life in society without CO_2 emissions, or rather not? What do you think? Exchange your views.

15 Min.

- Ask your grandparents about their youth and their CO_2 emissions and try to estimate beforehand: Did the grandparents tend to emit (discharge) less, the same amount or more CO_2? Take into account, for example, greater thriftiness or the use of old technologies.

30 Min.

- Take a look at your school: When and where are emissions consumed in the school? How could these be saved? Where is energy needed and how could it be saved? Which products are purchased for the school? Can you find climate-friendly alternatives? How can you contribute to climate protection as a class? Think about your own project and implement it in class. Motivate other people to implement climate protection projects – you can also enter into cooperation projects with other classes or other schools. You can then present your project at an exhibition as part of a school event or a Parents' Day.

Project lessons

Tips for educators

- Project to record CO_2 emissions for classes and schools: **co2nnect.org**
- Collection of videos, games and more on climate-related topics: **climates.boku.ac.at/en/good-practice**

Climate protection and politics

Suitable for

- **History and Social Studies/Political Education**
- **English**
- **Geography and economics**
- **Project lessons – interdisciplinary**

MODULE 7

Content overview for educators

Module 7 deals with the possibilities and measures on the political level that are necessary to get a grip on climate change. Participants learn that structural measures are also crucial and understanding different perspectives and positions. In this first introduction, information about greenhouse gas emissions of (industrial) countries and their global impact is provided. In the sub-chapters, the participants will acquire knowledge about the global climate process and on climate strategies at national and international level.

Methods used: round table (role play), text work and internet research as well as reflection and creative presentation of results.

Polluters and those affected by climate change[11]

While it is very important for each individual to act in order to man-made (anthropogenic) climate change, it is equally important that major, structural measures are also taken at the political level. The success of climate policy depends on local and national efforts as well as on international cooperation. The aim of climate protection is to reduce the speed and impact of global warming or, in the best case, to stop it.

Through the global comparison of CO_2 emissions. It is quite clear that the industrialized countries are the biggest polluters. China and the USA alone are responsible for over 40% of global CO_2 emissions. The large populations of these two countries put this figure into perspective somewhat. However, the industrialized nations also have a higher per capita consumption of CO_2 than other countries: they are well above the average of 4.8 tons per person per year. The USA consumes an average of 17 tonnes and Germany 9.2 tonnes per capita per year. Poorer countries such as Burundi with 0.03 tons or Cambodia with 0.7 tons only use a fraction of this. The per capita emissions of individual countries must therefore be significantly reduced.

In addition to the drastic environmental consequences, climate change also entails social-ethical problems, as it promotes inequality at various levels. Climate change affects different regions differently. Often, those most affected by the consequences of climate change are those who are least responsible for it. Industrially poor countries emit less CO_2, but often suffer particularly badly from the effects of climate change. This is due in part to their geographical location and also to their financial means, as no resources are available for climate protection or climate change adaptation measures. On the other hand, certain groups of people in industrialised countries are also affected. For example, those who are sick, elderly, or come from a low-income background are less able to adapt to temperature rises or severe weather. The concept of climate justice aims at shared responsibility for climate protection. It addresses the problem that the countries of the global South, who hardly contribute to global warming, but suffer particularly badly. Accordingly, fair global solutions should be found, and heavily emitting countries should assume their responsibility and lead by example in order to mitigate inequalities caused by climate change.

In order to get a grip on climate change, international agreements are needed (such as the Paris Climate Agreement signed in April 2016), in which as many countries as possible participate. In the individual nation states, the international requirements are then implemented in national strategies and, in the best case scenario, supplemented by their own initiatives nationally and regionally.

[11] Source for the entire section: CARE Deutschland e.V. (2020): *changemaker. Zeit, dass sich was dreht.* Eigenverlag: Bonn.

Tasks

50 Min.

Imagine that your municipality wants to become an e5-municipality. These energy-efficient municipalities commit themselves to implementing measures in various fields of action in terms of climate protection. The fields of action include spatial planning of the municipality, any municipal buildings and facilities, supply and disposal options (such as water supply or waste disposal), mobility, the internal organisation (such as municipal administration) as well as communication and cooperation to raise awareness among residents. The communities are then certified according to their implementation. Although financial means are necessary for the implementation, professional advice and networking opportunities are provided and the citizens of the municipality are given the chance to locally and actively participate in the development of their own community to contribute to climate protection. More information can be found on **e5-gemeinden.at**.

To do this, initiate a "round table" by putting yourselves in the roles of the 14 different interest groups in the communities. Get together in small groups of two to three people and represent the interests of one role. Use the preparation time to think of additional arguments and to gather suggestions for possible collaborations. After the preparations in the small groups you can present the arguments of the different interest groups under moderation at the round table. After the discussion in this large group, gather again in the small groups and discuss the feasibility of the tasks and projects. Important points of reference are the respective financial expenditures that have to be borne by the different groups. Orders of magnitude should be made known. Conclude the exercise again in plenary at the round table and present the results of the small group work in a creative way.

You do not have to represent all interest groups at the round table if you do not have enough participants. If your group is very large, you can also invent additional interest groups.

In the group, draw up a short summary when the two rounds of discussion are over:

- How did you personally feel about the role?
- How satisfied are you with the results of the discussion?
- How did you experience the discussion process?
- Can you imagine such discussion groups being useful in reality?

What possible interest groups are there and what interests do they pursue?

- **Mayor**

Wants to be certified as a climate protection municipality only if as many people as possible participate in the project. Has good relations with representatives of businesses and institutions and thinks highly of the concept of local Agenda 21 (citizen participation projects for sustainable development; communities take measures to develop towards sustainability).

- **School Director**

Is willing to integrate energy and climate protection topics into the curriculum. Teaching concepts should be developed in cooperation with teachers, students, parents and community representatives.

- **Farmers of the region**

They need financial aid to switch to organic farming. Regional products should be reliably sold in sufficient quantities by retail chains. Niche products must be specifically promoted. Farm-gate sales must not be restricted by regulated sales hours. The collection of organic waste must be made available to farms in appropriate quantity can be reduced. In cooperation with tourism associations, "farm holidays" concepts can be developed. Students and pupils can carry out practical work on the farms during the holidays.

- **Forest managers of the region**

Wood demand and supply must be balanced. The use and afforestation of forests need good management. The region's timber use must not exceed certain quantities. Forest nature trails can be established in forests close to schools, which are always available for school excursions and farm tours.

- **Tourism companies**

The requirements for certification must not have a negative impact on tourism. If the requirements are too strict, holidaymakers might stay away or the business might become too expensive. Public transport must be well organised so that guests can leave their cars at home. Especially during the seasonal periods, places that are attractive for tourists must be easily accessible. The region must present itself as a whole to the target group for ecotourism. The enterprises are willing to provide teaching staff with the necessary knowledge about an ecotourism enterprise, and students can be accepted as interns.

- **Transport companies**

Local public transport can only be expanded with financial support. The companies fear that the additional offer will not be fully utilised. Opportunities exist in cooperation with other existing facilities, such as postal buses. The connection to supra-regional public transport networks, such as the rail network, must be guaranteed.

- **Infrastructure companies (electricians, plumbers, chimney sweeps, ...)**

Additional training in the areas of renewable energy sources and sustainable products must be organised and financed for the employees. The companies are willing to take over part of the costs. In addition, training for girls is to be specifically promoted. For this, support from schools and administrative institutions is needed, as well as own application possibilities.

- **Architects**

Are called upon to pay more attention to the technology of passive and zero-energy houses in new buildings. In the case of conversions, they should contribute the necessary know-how and cooperate intensively with the installation companies.

- **Disposal companies**

Would actively cooperate in an educational campaign for waste avoidance and separation, but the costs are to be shared. For the operational conversion to the latest environmental technology, they need financial support. In an emergency, a loan can also be taken out with the regional bank.

- **Retail chains, shops**

Are willing to offer regional products as long as they do not take a loss with it. The promotion of the products should be realized together with local institutions and the costs should be shared. Consumers should have the opportunity to see the businesses "with their own eyes".

- **Banks**

Declare their willingness to support climate-friendly projects with low-cost loans. However, they are not "welfare companies" and must watch their profits.

- **Scientific consultants on regional development, energy and material flow analysis**

Evaluation and monitoring of existing structures, feasibility analyses for future projects, air quality and water quality measurements, analysis of soil samples, etc. The assignments have to be financed externally, the universities are dependent on third-party funding. The project is also a training opportunity for students.

- **Interested or affected citizens**

Residents who build a house want to build economically and environmentally friendly from the beginning. Owners of existing buildings do not want to have to carry out costly conversions, unless local politics and administration support them.

- **Industrial companies**

The companies fear that stricter environmental regulations will be associated with high costs and that they will have to accept a loss of turnover. They are important job preservers in the region, but would consider moving away if conditions were tightened.

50 Min.

Research and collect information about all continents: Which countries are the biggest CO_2 emitters? How are the effects of climate change already visible on the individual continents? Divide up the continents and work in small groups. Design posters and present them to each other.

On the following websites you will find information about the effects in the countries of the global south. Click through the categories or use the keyword search. Of course, you can also search for other sources.

- **oxfam.org/en**
- **care.org**

50 Min.

There are many people who are actively engaged in climate protection. One of them is the young Swedish woman Greta Thunberg. In 2018, she started weekly strikes for climate protection on Fridays in front of the Swedish Parliament. These initiated "school strikes for climate" developed into the global movement "Fridays for Future". Do some research on the Internet about Fridays for Future. Afterwards, think about the following questions on your own and then discuss them in small groups.

What do you think of this behavior?

- What arguments do you think there are for students to participate in such a strike? Are there any counterarguments?
- What difficulties could arise for teachers as a result of the weekly school strikes occur?
- How might parents feel about school strikes?
- What arguments can different politicians put forward for or against such initiatives?

Then get together in small groups for the different roles (such as teachers, pupils, parents or politicians) and present the arguments from the different perspectives. You can be creative in your presentation: shoot a short video, think about a short commercial and perform it, create an Instagram post, ...

The international climate process

Suitable for

- **History and Social Studies/Political Education**
- **English**
- **Geography and economics**
- **Project lessons – interdisciplinary**

MODULE 7a

Content overview for educators

In Module 7a, the participants acquire knowledge about political measures at the international level. This should awaken their interest in actively following climate policy. The various discussion opportunities can contribute to the formation of opinions.

Methods used: internet research, information gathering through short videos, role play, discussion groups and preparation, and presentation of results.

Climate conferences[12]

Climate change has been a concern of the global community for decades. At the United Nations World Conference on Environment and Development in Rio de Janeiro (Brazil) in 1992, environmental issues were discussed for the first time on a large global scale. The United Nations Framework **on Climate (UNFCC), which was** agreed at this conference and came into force in 1994, plays a central role. This Framework Convention on Climate Change is the first international environmental treaty on climate protection. It includes the goal of stabilizing greenhouse gas emissions so that no anthropogenic damage occurs to the climate system.

Since 1995, UN climate conferences have been held annually between the parties to the Framework Convention on Climate Change in order to negotiate concrete measures for climate protection. The UN Climate Conference is also known as the Climate Summit or COP (Conference of the Parties).

At the third **Climate Change Conference (COP 3) in Kyoto (1997),** binding targets of emission ceilings for industrialized countries were agreed for the first time. After this agreement, the "Kyoto Protocol", only entered into force in 2005, the subsequent climate conferences were primarily concerned with the design of the Protocol.

The **Climate Change Conference (COP 15) in Copenhagen (2009)** had the objective of achieving a comprehensive and global climate protection agreement, which was to be applied as an international set of rules after the expiry of the Kyoto Protocol. However, due to major differences of opinion between industrialised countries and countries of the global South on how to reduce emissions, no agreement could be reached. After Copenhagen, the global community agreed to move gradually towards the goal of a new climate protection agreement.

At the **Climate Change Conference (COP 18) in Doha (2012),** a second commitment period of the Kyoto Protocol was adopted for the purpose of reducing emissions, and the decision was taken that an international climate protection agreement should be adopted by 2015 at the latest, to be implemented from 2020. The subsequent climate conferences in Warsaw (2013) and Lima (2014) thus dealt with step-by-step negotiations to reach a global climate protection agreement. The main points of contention in the negotiations were the financing of aid funds and overly strict targets.

The **Climate Change Conference (COP 21) in Paris (2015)** is considered a milestone in the history of climate protection. After the climate conferences of recent years were overshadowed by relatively weak results, the agreement in Paris was seen as a breakthrough for a joint, global climate protection agreement.

A comprehensive rulebook was created at the **Climate Change Conference (COP 24) in Katowice (2018),** which enables the implementation of the Paris Climate Agreement. Accordingly, all states should implement measures to achieve the targets of the Paris Climate Agreement to reach.

[12] Sources for the entire section: Wikipedia (2021): *UN-Klimakonferenzen.* Last accessed on 11/2/2021 at de.wikipedia.org/wiki/UN-Klimakonferenz.
BMK (n. d.) *Internationale Klimaverhandlungen.* Last accessed on 11/2/2021 at www.bmk.gv.at/themen/klima_umwelt/klimaschutz/int_klimapolitik/klimaverhandlungen.

At the invitation of the Secretary-General of the United Nations António Guterres, the 2019 **New York, a UN climate summit** with heads of state and government took place in order to promote climate protection measures in accordance with the Paris Climate Agreement. At this climate summit, 65 countries besides Austria declared their intention to become climate neutral by 2050.

The Kyoto Protocol (2008 to 2012)[13]

In 1997, the Kyoto Protocol was adopted at the third climate conference and entered into force in 2005. For the first time, it contained internationally binding obligations to limit and reduce greenhouse gases for industrialised countries. There were no obligations for developing countries. The aim was to reduce the emissions of the most important greenhouse gases of the industrialised countries by at least 5 % in the period from 2008 to 2012 compared to the year 1990. Countries made different commitments to reduce emissions, such as Japan with a 6% reduction, Russia with 0% and the European Union with 8%. The collective burden of the EU was shared individually among the member states (e.g., Austria –13%, Germany –21%, UK –12.5%, France +/- 0%).

In the Kyoto Protocol, three flexible mechanisms were devised to enable industrialised countries that signed the Kyoto Protocol to meet their emission reduction targets.

- **Joint Implementation:** here, an industrialized country invests in an emission-reducing project in another industrialized country and in return receives a portion of the reductions achieved as a reduction certificate for the emission. Thus, it increases its emission rights. The host state must reduce its emissions in line with the exported emission certificates. Such projects can help to ensure that emission-reducing measures are implemented first where they are most cost-effective.
- **Clean Development Mechanism:** here, an industrialized country invests in an emission-reducing project in a developing country and can thereby acquire "Certified Emission Reductions" (emission reduction certificates). Such projects are intended to promote the transfer of environmentally friendly technologies to developing countries and contribute to sustainable development.
- **International Emissions Trading:** industrialized countries are allowed to trade emission certificates with each other. If a state produces more CO_2 than it is allowed to according to the certificates, it can buy additional emission certificates from other states.

The Kyoto Protocol has garnered a lot of criticism. Primarily because the global emissions trend continued to rise in the period described, i.e., up to 2012 (almost 30 percent compared to 1990). Among other things, the rapid development of emerging economies such as India and China is seen as the reason for this.

13 Source for the entire section: BMU (2017): *Kyoto Protokoll.* Last accessed on 11/2/2021 at www.bmu.de/themen/klima-energie/klimaschutz/internationale-klimapolitik/kyoto-protokoll.

The Kyoto Protocol II (2013 to 2020)[14]

In 2012, at the Climate Change Conference in Doha (COP 18), a second commitment period of the Kyoto Protocol was adopted. However, not all countries participated on this occasion, and the participating countries with a reduction commitment were responsible for a total of only 15% of the global greenhouse gas emissions. However, countries such as New Zealand, Canada (already dropped out in 2011), Russia or Japan no longer participated in the new edition of the Kyoto Protocol, which meant that payment contributions were also eliminated. China and the USA, which are regarded as the main producers of CO_2 emissions, did not enter into any reduction commitments this time either.

In the second commitment period, trading in emission rights was restricted and another greenhouse gas (nitrogen trifluoride NF3, which is produced in the production of flat screens or solar cells) was added to the list of greenhouse gases to be contained. The commitment period of the Kyoto Protocol II ran from 2013 to 2020 – until the new international climate agreement, which was adopted in Paris and again made all states responsible, came into force.

Paris Climate Agreement (2015)[15]

Efforts in recent years to establish a global climate treaty came to a conciliatory end at the Climate Change Conference (COP 21) in Paris (2015), where the agreement was adopted in December 2015. In April 2016, the treaty was signed by 196 parties (from 195 countries and the EU) in New York City. The internationally legally binding climate change agreement has now been ratified by 189 countries, including the European Union (as of March 2021). After a brief absence, the USA has also been back in the global climate protection agreement since the beginning of 2021.

The aim is to limit global warming to well below two degrees and to make efforts towards 1.5 degrees. For the time being, this is to be achieved by reducing emissions. In the second half of the century (from 2050), greenhouse gas neutrality is to be achieved. Roughly speaking, this means that CO_2 emissions (e.g., from agriculture or the burning of fossil fuels) and CO_2 absorption (e.g., by oceans and forests) should be in balance and neutralise each other. Concrete measures on how Parties should reduce their emissions are not specified in the agreement. Since the national plans of the states to reduce greenhouse gas emissions are not ambitious enough to meet the sub-two degree target, progress in this area is to be reviewed every five years and updated with more ambitious contributions – and this is to be done by industrialised countries, emerging economies and developing countries to the same extent.

Although the agreement is legally binding, there are no sanctions if violations of the agreement are committed. The committee that verifies compliance with the agreement can only tarnish a country's reputation and thus indirectly sanction it. The industrialised and emerging countries are called upon to provide financial support for climate protection measures in developing countries.

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14 Source for the entire section: Umweltbundesamt (2013): *Kyoto Protokoll.* Last accessed on 11/2/2021 at www.umweltbundesamt.de/themen/klima-energie/internationale-eu-klimapolitik/kyoto-protokoll#zweiteverpflichtungsperiode-und-zentrale-anderungen.

15 Sources for the entire section: BMU (n. d.) *Bilanz nach 5 Jahren Pariser Abkommen.* Last accessed on 11/2/2021 at www.bmu.de/themen/klima-energie/klimaschutz/internationale-klimapolitik/pariser-abkommen/bilanz-nach-5-jahren-pariser-abkommen.
Statista (2021): *Der Stand des Pariser Abkommens.* Last accessed on 11/2/2021 at de.statista.com/infografik/9667/der-stand-des-pariser-abkommens.

Intergovernmental Panel on Climate Change (IPCC)[16]

The Intergovernmental Panel on Climate Change (IPCC) was founded in 1988 as an intergovernmental institution. Its purpose is to provide a scientific account of the current state of research on climate change, its impacts and mitigation, and adaptation strategies. The reports of the Intergovernmental Panel on Climate Change are intended to provide the basis for political decisions without making concrete recommendations for action. The Assessment Reports (AR) of the Intergovernmental Panel on Climate Change are considered to be particularly valuable. They contain scientific fundamentals, consequences, and impacts of climate change as well as possible adaptation and mitigation options. A summary of the three areas for political decision-makers is also included. The fifth assessment report was published in 2014, and since 2017 experts have been working on the sixth assessment report, which is due to be published in 2022.

Tasks

- Watch a video about the Paris Climate Agreement on YouTube **"COP21 Agreement: Explained"**.

  Then research the climate agreement on the Internet and discuss in the group: will the Paris climate agreement have the desired effect? What are the criticisms or weaknesses of the climate agreement? Is the criticism justified? What do you think is good about this agreement, why can it work? What do you think is not so good, why do you think the climate agreement might not work?

50 Min.

- Take on different roles (e.g., politicians at different levels, worker, farmer, manager, ...). Put yourselves in the shoes of the different and think about the corresponding point of view. Then hold a group discussion based on your roles and try to find a new measure for climate protection that everyone is happy with.

  After you have put down your roles, discuss what worked well and what didn't work so well in the discussion and what the reasons might be.

30 Min.

- Since, historically, the industrialized countries have been the main cause of the current climate change, but developing countries, such as some island states and some countries in Africa and Asia, are particularly hard hit by climate damage, they are demanding compensation payments ("offsets") from the rich nations. What do you think of this demand – is it justified or exaggerated? Watch the short film **"How does climate change hit poor countries?"** on EurActiv.com. Divide into two groups and discuss it – one group arguing from the point of view of developed countries, the other from the point of view of developing countries.

20 Min.

16 Source: Wikipedia (2021): *Intergovernmental Panel on Climate Change.* Last accessed on 11/2/2021 at de.wikipedia.org/wiki/Intergovernmental_Panel_on_Climate_Change.

20 Min.

The Paris Agreement is legally binding, nevertheless, the states that do not comply will not be subject to financial penalties. Do you think this arrangement makes sense? What would you suggest? What could motivate countries to comply with the agreement anyway?

30 Min.

The signing of a treaty alone will not save the world. Divide into five groups and choose one country per group. Research what this country is doing in the area of climate change to meet the goals of the Paris Agreement. Afterwards, present your national strategy plans to each other in the large group.

Tips for educators

- Video from "UN Climate Change" on YouTube
  Ever wondered: What is the "Paris agreement", and how does it work?
- Video from "WWF-Brasil" on YouTube
  The Paris Agreement for Climate Change

Climate strategies

Suitable for

- **History and Social Studies/Political Education**
- **English**
- **Geography and economics**
- **Project lessons – interdisciplinary**

MODULE 7b

Content overview for educators

In Module 7b, the participants learn more about the climate strategies of the European Union and Austria. Together they develop different points of view on the topic – the participants can get to know different positions and form their own opinion on the subject.

Methods used: brainstorming, internet research, working with newspaper articles, discussion, working with short videos, developing different points of view on a topic, conducting an interview and working with visions of the future.

Climate protection in the European Union

An essential core element of EU climate policy is emissions trading. Under this system, energy-intensive plants (such as steelworks, oil refineries or certain plants for the generation of electricity and heat) as well as aviation in the participating states are allocated a number of emission certificates that defines the maximum permissible level of greenhouse gas emissions. If insufficient allowances are presented at the end of the year to cover the emissions, heavy fines may be imposed. The certificates can be freely traded by companies as needed, for example if more or less is emitted. This emissions trading system ensures the necessary flexibility to make emission reductions in the most cost-effective places.[17]

Around 10% of global greenhouse gases are emitted by the European Union. The "European Green Deal", which was presented in 2019, sets out how the EU will contribute to climate protection. The aim is to reduce greenhouse gas emissions by 55% compared to 1990 and to achieve climate neutrality by 2050. This target is to be enshrined in EU law with the European Climate Change Act, making it a guiding principle of EU policy.[18]

However, in order to achieve this ambitious goal and comply with the Paris climate agreement, the current economic system needs to be rethought. Various sectors are effected: from food, agriculture, taxation and consumption to finance, digitalisation and social performance. Ambitious action must be actively taken in all sectors of the economy. For example, renewable energy sources should be increasingly used to achieve decarbonisation of the energy sector, and the energy efficiency of buildings should be increased. At the same time, industry should be supported in environmentally friendly technologies and investments, and mobility should be made environmentally friendly and cost-effective.[18]

Member States commit to developing appropriate national plans and actively implementing measures to contribute to the achievement of the targets. To keep the European Union on track for climate neutrality in 2050, the progress and plans of individual Member States and the EU will be regularly reviewed. This review will take place by September 2023 and every five years thereafter by the European Commission. If the measures are not appropriate, recommendations will be made by the European Commission on how to achieve the targets. The Member States concerned will then have one year to submit an adapted plan in line with the new recommendations or to provide sufficient justification as to why the recommendations cannot be taken up. Similarly, the collective progress of the EU is assessed and conclusions drawn by the European Commission.[18]

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17 Source: Europäische Kommission (n. d.): *Emissionshandelssystem (EU-EHS)*. Last accessed on 11/2/2021 at ec.europa.eu/clima/policies/ets_de.

18 Source: Europäische Kommission (2020): *Vorschlag für eine VERORDNUNG DES EUROPÄISCHEN PARLAMENTS UND DES RATES zur Schaffung des Rahmens für die Verwirklichung der Klimaneutralität und zur Änderung der Verordnung (EU) 2018/1999 (Europäisches Klimagesetz).* Last accessed on 5/25/2021 at eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=CELEX:52020PC0080.

The Austrian Climate and Energy strategy[19]

As a member state of the European Union, Austria is committed to developing a roadmap for achieving the climate and energy targets. The National Energy and Climate Plan (NEKP) contains corresponding measures and serves as a climate policy strategy for Austria from 2021 to 2030, whereby missing targets can entail costs for the state in the billions of euros, either through the purchase of CO_2 certificates or through EU penalties. By 2030, the goal is to reduce greenhouse gas emissions in sectors outside the EU emissions trading scheme by at least 36% compared to 2005. Overall, the aim is to further develop the energy system and decarbonise it accordingly by 2050. The measures for achieving the target are divided into five dimensions:

- Decarbonization
- Energy efficiency
- Security of energy supply
- Internal energy market
- Research, innovation and competitiveness

In general, a massive expansion of renewable energies and the further development and use of energy-efficient measures are targeted. The measures of the different dimensions often overlap in terms of content. For example, the energy improvement of buildings concerns both dimension 1 (decarbonisation) and dimension 2 (energy efficiency).

In order to make progress in the field of low-emission mobility, Austria advocates the principle of "Avoidance – Relocation – Improvement".

For example, e-mobility is to be significantly increased through tax concessions. At the same time, more incentives are to be created for climate-friendly travel. This includes, for example, the expansion and extension of the infrastructure for cycling and walking as well as public transport. The introduction of a uniform tariff system and the reduction of ticket prices for public transport are also envisaged. Through the expansion of rail networks freight transport is also to be shifted from road to rail.

In the building sector, emissions are to be reduced, for example, through increased renovation and the abandonment of fossil fuels in new buildings. In agriculture and forestry, the preservation of arable land and permanent grassland and the use of agricultural waste products for biomethane production are targeted. Attention is also to be paid to increased grazing and adapted feeding strategies (high-quality fodder and multiphase feeding to reduce greenhouse gases in cattle).

In the energy system, for example, waste heat from existing plants, such as in the area of waste incineration, industry or CHP plants, should be used more in the future. Research plays an important role in energy innovations (such as storage solutions or intelligent grid management). Increased educational offers and the anchoring of energy efficiency and climate protection in curricula and skilled worker training should therefore contribute to increased numbers of researchers. In general, awareness-raising measures are needed in all dimensions opportunities for the relevant groups of people.

Detailed information on the National Energy and Climate Plan can be found, among other places, on the website of the Federal Ministry for Climate Action: **bmk.gv.at/en**.

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[19] Sources for the entire section: BMNT (2019): *Integrierter Nationaler Energie- und Klimaplan für Österreich.* Last accessed on 11/2/2021 at www.bmk.gv.at/dam/jcr:032d507a-b7fe-4cef-865e-a408c2f0e356/Oe_nat_Energie_Klimaplan. Die Presse (2019): *Verfehlte Klimaziele kosten Republik Milliarden.* Last accessed on 11/2/2021 at www.diepresse.com/5621378/verfehlte-klimaziele-kosten-republik-milliarden.

Tasks

30 Min.

Watch the video **"The EU Emissions Trading System explained"** on YouTube. What do you think about emissions trading? What advantages and disadvantages could it bring? How can the emissions trading system contribute to climate protection? What would it mean for you if there were emission certificates for everyone? Discuss this first in small groups and then in plenary.

30 Min.

Form teams of three to four people and try to find a solution with the help of internet research to answer the following questions:

- What does the word "decarbonization" refer to?
- What does it mean to live "within ecological limits"?
- What is meant by "Circular Economy"?
- How would you describe "climate neutrality"?
- What is meant by "polluter pays principle" and "precautionary principle"?

As a class, compare what answers you came up with.

15 Min.

Write a letter/email (also at home) with your personal vision of the world in the future. Start with the sentence: "In 2050 we will live …".

You can decide together what to do with your letters: should they be hung up in the hallway or in class, sent to a politician, put on the school website, shared with the school community in a presentation, etc.?

20 Min.

Reflect together in the group on the topic of climate protection in Austria: do you already know about actions, initiatives, campaigns or climate protection projects in Austria? What ideas do you have yourselves? Create a board picture with all your ideas.

- Work through the information text on climate strategies above and memorise the most important facts. Try to get an overview of the current state of affairs in Austria or the European Union. For this purpose, you can search (online) daily newspapers and magazines for current articles on this topic. You can also find information on this topic at **bmk.gv.at/en** or **ec.europa.eu**. Search for appropriate keywords on the topic, such as "climate", "energy" or "strategy". After your research, supplement the information text with facts that seem important to you.

35 Min.

- Climate protection is a process. Keep up to date with (online) research and articles in newspapers. Where does Austria currently stand in the field of climate protection? You can create a wall newspaper in class in which you continuously document the individual steps and milestones of the government.

Project lessons

- What does your community or city do for climate protection? Think together about which political measures you are aware of. Then ask the mayor or another local politician about this topic. You can write an e-mail or a letter or visit and interview them in person by arrangement.

  There are bound to be people interested in this topic among citizens and your classmates. Document your interview or discussion – perhaps even with an audio recording or video – and create a podcast or video, or post about it on a blog or appropriate social media channel. Let others share in the knowledge you've gained.

Project lessons

Tips for educators

- Video from "European Commission" on YouTube
  EUGreenDeal – EU Emissions Trading System
- Video of "European Comission" on YouTube
  Green Deal Proposal
- Explanations of terms related to climate change on ipcc.ch
  Glossary

Climate protection and the economy

Suitable for

- **Geography and economics**
- **English**
- **Psychology and philosophy**
- **Project lessons – interdisciplinary**

MODULE

8

Content overview for educators

Module 8 provides an opportunity to engage with the issues of business and climate change. The participants think about the responsibility and the possibilities that the economic sector can contribute to climate protection.

Methods used: planning and implementation of an excursion, internet research, (group) discussion, reflection on production structures and drafting images of the future.

From a linear to a circular economy[20]

What are the opportunities for business with regard to climate change? How can the economy actively contribute to eliminating the problems posed by climate change? Our current economic order is based on constant economic growth, which in turn is based on the consumption of resources. However, endless growth on a planet with finite (non-renewable) resources is not possible. We now produce and consume as part of a throwaway economy, where we extract resources which we then either convert so that they can no longer be used (e.g., oil, gas, coal for energy production) or throw away after use (waste). Recycling of waste is already practised in many industrialised countries, but here too the proportion of raw materials returned is only a fraction of the finite resources newly introduced into the production process.

Following the example of the material cycle in nature, the switch to a circular economy could be part of the solution to this problem. This is because the concept of a circular economy aims to return raw materials used to the production cycle, thereby reducing emissions and waste to a minimum. Instead of burning resources or throwing away goods at the end of their life cycle, they are reused or recycled. This greatly increases the rate of recycling, which reduces the amount of new resources that need to be introduced into the cycle for production. The circular economy therefore helps to reduce the consumption of resources and to recycle waste more sensibly. Part of a circular economy is therefore also an energy transition that reduces the one-off consumption of non-renewable resources such as coal, gas and oil for energy production and replaces them with renewable resources such as water, wind and sun.

The circular economy aims to ensure that existing materials and products are shared, rented, reused, refurbished, repaired and recycled for as long as possible. To achieve these goals, circular economy starts with smart product design, which includes the entire life cycle of products and services. Goods must be manufactured in such a way that the service life of the products is increased and individual components can be replaced more easily in the event of defects and reused more effectively after use. Not only the composition of goods, but also the raw materials used are rethought from the ground up in the circular economy. From a mobile phone based on a replaceable modular system to compostable T-shirts, everything is conceivable here.

As consumers, each of us has an influence on how we shape our future by deciding (should a new purchase really be necessary) against products of a throwaway economy and for goods that are produced in a socially fair and ecologically justifiable way. The greater the demand for such products, the more likely it is that manufacturing companies will orient to the concept of a circular economy.

[20] Source for the entire section: Wikipedia (2021): *Kreislaufwirtschaft*. Last accessed on 11/2/2021 at de.wikipedia.org/wiki/Kreislaufwirtschaft.

Tasks

15 Min.

Take a pen and a small notepad, think of the keywords "economy" and "climate change" and spontaneously draw an emoticon on the notepad according to your associations. Briefly tell each other what facial expression your emoticon has and why or what you thought of in connection with the two words. Stick your emoticons on a poster and label each one with a keyword that describes your thoughts about it. Order the faces according to their emotion so that you get an overview of the mood on this topic in the group.

Discuss briefly: do you in the group have a positive or negative attitude towards the economy and climate change as a whole? Do you feel powerless and at the mercy of the economy or do you think that everyone can make a difference in this area? What opportunities do you see for the economy to make an important contribution to climate protection?

30 Min.

An example of the circular economy is the principle of cradle-to-cradle, the name of which stands in contrast to our current production and consumption behaviour in a throwaway economy (cradle-to-grave). Research this on the internet, e.g., at **eeb.org** or **epea.com/en** and discuss in the group:

- What do you think of a circular economy?
- What is Cradle to Cradle?
- Have you already been involved in the circular economy or cradle-to-cradle (e.g., as a consumer)? Do you know any examples of this?
- Which products designed according to the Cradle to Cradle principle and that you didn't know existed already?
- What ideas do you have for products based on the principle of the circular economy?

3-4 Hrs.

Find companies in your area that operate in a climate-friendly and sustainable way and agree on one that you would like to visit. Plan an excursion to the chosen company and compile a catalogue of questions that interest you in advance. Document your excursion and the information you get there in a suitable form (blog, video, podcast, Instagram story, report, ...).

20 Min.

Not only as a consumer, but also as an employee or self-employed person you can make a difference. In the economy, we often talk about "green jobs". These describe jobs in the field of manufacturing products, technologies and services that avoid environmental damage and conserve natural resources. Get an idea of the different green jobs on offer – you can find an overview at **ecotechnology.at/en** or **jobsingreen.eu**, for example.

Are there any jobs that interest you and that you could imagine doing? If yes, why? If not, why not? Exchange your views on this.

Some of you will use the summer holidays to earn money through a holiday job and to get a taste of the professional world and gain valuable experience. Some of you may want to do a voluntary environmental year after leaving school. You can do both with Green Jobs! If you're interested, do some more research online. You might find something that suits you.

30 Min.

Every product has its own story, and this story is often much longer than it might seem at first glance. It goes from the extraction of the raw materials to the production, distribution and our consumption and does not end in the domestic dustbin. Choose an object of your choice and think about the individual history of the product. The following questions can help you:

- What raw materials are needed for your products and where are they obtained?
- What parts of the world have already seen your products and what stations have they already gone through (due to manufacturing, distribution, etc.)?
- Who has already held your product in their hands (both the individual parts and the the finished product)?
- What happens to your products when you stop using them?

Tell each other the different stories of your products, add to them and exchange ideas.

60 Min.

What will our future look like? Design three different scenarios of how the economy deals with climate protection in 2050:

1. a positive extreme scenario (best-case scenario)
2. a negative extreme scenario (worst-case scenario)
3. a trend scenario (based on the current situation, i.e., a "going forward" scenario)

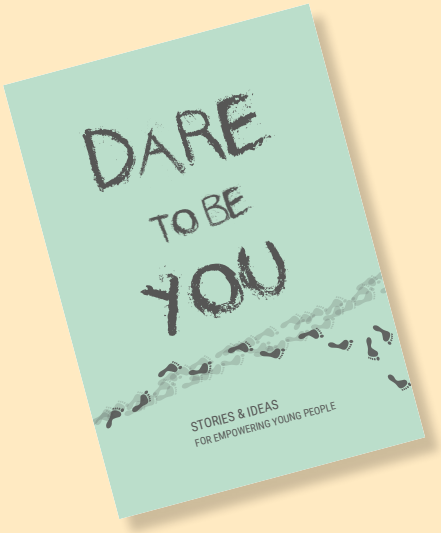
Create a visual representation of each of the three scenarios – you can be as creative as you like (e.g., make collages, paint, draw comics, stage photos, ...). Then display your work in class or post it on a blog or social media channel. At the end, draw up a summary together: Which scenario is likely to happen and how likely is it to happen? How can you contribute to making the positive extreme scenario a reality? Record your ideas in a catalogue of measures.

Tips for educators

- Learning poster on the topic of plastics and the circular economy on umweltbildung.at
  Tracing plastic
- Annie Leonard's explanatory video on production and consumption structures
  The Story of Stuff
- Video on YouTube of "The Story of Stuff Project".
  The Story of Plastic (Animated Short)
- Information and teaching materials on the circular economy on cyclecc.eu
  CYCLE Competence Centre

Sparked your interest?

Here you will find further teaching materials and publications by the Forum Umweltbildung!



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A reading book full of stories about the 17 global sustainability goals. They are about how it is possible to face big and small problems with courage and perhaps even a little joy.

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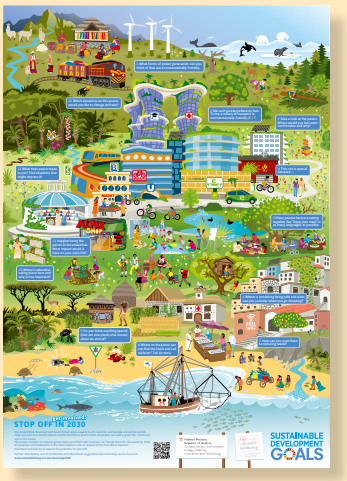
www.umweltbildung.at/tanz-aus-der-reihe-lesebuch



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This booklet has been prepared as a didactic basis for work with young people aged 15 to 19 and can be used in lessons and youth work. This makes it possible to deal comprehensively with the topics of climate change (adaptation) and climate protection.

- What is the current state of knowledge about our climate and what effects are already being felt?
- How does climate research obtain reliable information?
- What is a carbon footprint and what does it have to do with me?
- What opportunities do I have to contribute to climate protection?
- What options do politics and the economy have to get a grip on climate change?

These and other questions can be dealt with and discussed in a methodologically diverse way using the suggestions in this booklet.