

Climate CO₂cktail

Ingredients for a sustainable footprint

With new

CO₂
CALCULATOR 2



Pedagogical materials
about climate protection
and (adaption to)
climate change for the
age of 15 to 19

On behalf of



MINISTERIUM
FÜR EIN
LEBENSWEERTES
ÖSTERREICH

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Education for Sustainable Development

This booklet was designed for educators to help their students understand climate change and its importance for our society.

The methods of this booklet were built according to the principles of Education for Sustainable Development. The pedagogical concepts are supposed to stimulate students on multiple levels and thus help them acquire knowledge and skills which are necessary for shaping a sustainable future. Participation, cooperation, critical thinking, reflection, problem-solving, hands-on acting, the development of visions, and students' everyday reality are pivotal for this.

Besides, there is a focus on the variety of didactic methods within one learning unit. Target-group-oriented descriptions help adolescents not only to verbally engage with the topic but to increase their repertoire of skills through learning on their own. Suitable methods could be producing videos, conducting interviews or writing and designing blogs as well as organising events or presenting results in front of a chosen audience. The following materials provide various suggestions.

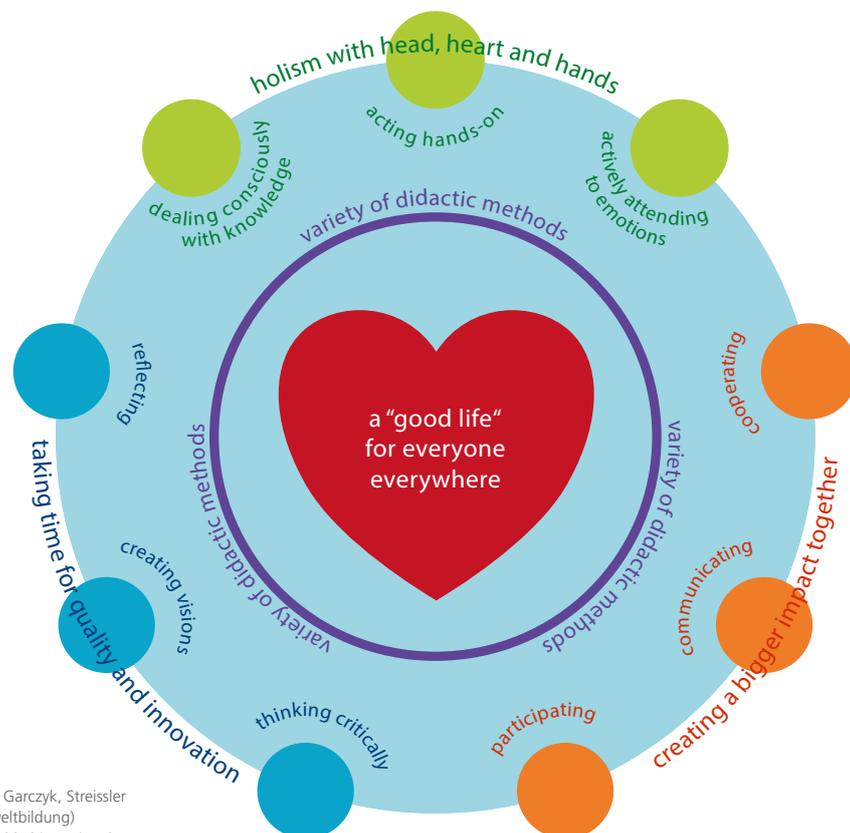


Chart: Stelzer, Garczyk, Streissler
(FORUM Umweltbildung)
in: bildung.nachhaltig.regional

How to use this booklet

This booklet serves as a methodological framework for teaching adolescents from 15 to 19 about climate change, climate change adaptation, climate protection and carbon footprint.

With its flexible system of thematic modules it allows to focus on selected topics as well as on a customised thread of modules for a certain target group, plus all the exercises can be extended if needed. The time designated to each exercise refers to the minimum amount of time spent but may vary. Each chapter/module starts off with proposals for ideally suited teaching subjects. Additionally, an online library at umweltbildung.at provides all the links used in the booklet.

These materials are suited for project work or extracurricular youth education in case there is enough time and space provided to become acquainted with the topics and identifying personal interests. If this doesn't apply, all the materials may be used for acquiring knowledge and skills through self-study as well.

We wish you exciting and inspiring work on the topic of climate change using our didactical materials!

1

Geo

Eco

Lng

Bio

C-S

MODULE 1

Climate research

Suitable for the subjects:

Geography | Economics | Language (e.g. German) | Biology

Cross-subject projects

Overview of content for teachers:

Module 1 is suitable for introducing students to the topics of climate change and climate protection. It aims to start from the young people's current level of knowledge and experience and allow them to develop new insights into the topic by building on this foundation.

Module 1 includes the following methods: Initial brainstorming including working on results in the group, recording and discussing what students currently know using posters, discussing the students' own perception of the topic in the media and initial research exercises and work with texts on the topic of climate research.

How does climate research work?

Climate research is a complex field involving many different factors. Climate data measurements and reconstructions of historic climate data are used as the basis for global climate models that are ultimately used to develop predictions about future climate trends. But what needs to be borne in mind when working with climate data measurements? And where do theories about past climate conditions and predictions of future ones come from?

Climate researchers use a variety of climatological methods to obtain their results:

Climate reconstruction:

Historic climate conditions can only be reconstructed, since there is no direct data about periods in the distant past. Researchers use what is known as "proxy data" – indirect climate data from natural archives (e.g. analysis of ice cores or tree rings) or historical sources – to draw conclusions about historic climate conditions.

Climate measurement:

For the much shorter period consisting of recent centuries and the present day, researchers can draw on climate data that has been directly measured (e.g. air temperature, precipitation, humidity, wind, etc.).

Glaciology:

Ice sheets and glaciers can also be used to understand climate fluctuations and trends.

Climate modelling:

Global climate models make it possible to estimate what proportion of changes in the earth's climate system are down to individual natural and human influence factors. Creating these complex, computer-based climate models involves a lot of work.

Quality control for scientific publications:

Climate researchers at both Austrian institutions (such as the ZAMG – the Central Institution for Meteorology and Geodynamics) and international ones (such as the IPCC – the Intergovernmental Panel on Climate Change) use a peer review process. This means that all research papers must be reviewed by fellow researchers before they can be published.

The ZAMG website (see source) provides more detailed information on individual research methods.¹

Tasks:

- ▶ What ideas do you associate with the term “climate change”? – Brainstorming with a twist.

Each participant gets ten small pieces of paper. Walk around the room without talking and think about the term “climate change”. Write down each association you can think of on a different piece of paper and then simply drop each one on the floor until you've used up all the paper.

Then gather up all the pieces of paper and attempt to group them. Are there different topic categories that the individual notes or terms/clusters of words can be grouped into? Which topic categories have the most notes? Which have the fewest? If you look at all the notes together, is it possible to identify any tendencies in people's attitudes towards climate change (generally optimistic or generally pessimistic, emotional or indifferent, etc.)?

As a group, spend a short time discussing the notes and what associations you have with the concept of climate change.

15
min.

¹ (Source: ZAMG (2016). www.zamg.ac.at/cms/en/climate. Last accessed on 9 September 2016.)

30
min.

- ▶ We constantly hear or read reports and information about climate change that predict extremely serious consequences in the future. But we also frequently hear from sceptics who cast doubt on these supposed facts or downplay how serious they are.

Think about everything you know about climate change: which facts do you think are correct and based on evidence, and which ones are not? Why? As a group, write down your answers on a poster and arrange them into three columns:

Facts	Suppositions (might or might not be true)	Myths (definitely untrue)
...

For each fact about climate change you want to add to the list, have a short debate about why you think this information is correct and come to an agreement in the group. Only facts that are accepted by the majority go in the "Facts" column. You might be surprised how many supposed "facts" you have to put in the "Suppositions" column. Don't be discouraged! At the end of the brainstorming session, share out the entries in the "Suppositions" column among different people in the group. Spend 15 minutes researching online and try to turn as many of the suppositions into facts as possible so that the "Facts" column is nice and full by the end. Put up the poster in the classroom. After you've spent some more time working on the topic, you might find it interesting to see how much you knew about climate change back when you first started.

30
min.

- ▶ You'll often find articles about climate change in newspapers and magazines. Go online and collect a selection of articles from newspaper websites. Summarise the facts from each article. You can take an article as a pair and then present the facts to each other. Look in sections like "Environment", "Nature" or "Science", or search for relevant keywords.

Then analyse the articles in relation to the following questions and compare them:

- What do the different articles agree on?
- Are there also some points that certain articles disagree on?
- If you find any points of disagreement, which article do you find more credible and why?

20
min.

▶ Carry out more research online, for example on the [Hadley Centre for Climate Prediction and Research](#) website, and answer the following questions:

- How is knowledge about the climate acquired?
- Which people or organisations carry out climate research in your country?
- What climate data can be directly measured?
- How can we acquire knowledge about past centuries?
- How does peer review work? What's the point of it?

Other 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:
cru.uea.ac.uk/information-sheets

2

MODULE 2

Climate change

Geo

Eco

Ch

Bio

Lng

Art

C-S

Suitable for the subjects:

Geography | Economics | Chemistry | Biology | Language (e.g. German) |
Art and design

Cross-subject projects

Overview of content for teachers:

Module 2 covers the greenhouse effect in depth. The aim for adolescents is to acquire wide-ranging knowledge of the topic, which they then put into their own words to share it with others. Creative approaches are used to help reflect on the knowledge they have acquired and how to share it with others.

Two types of methods have been chosen for this module. Firstly, ones that enable students to engage with the topic at a cognitive level (textual work, devising and answering questions about the text and presenting what they have learned in teams). Secondly, ones that allow students to engage with the topic in a creative manner, to critically question it and to reflect on it (working on an information film and discussing it, responding to cartoons, producing their own creative work). A variety of different methods are employed in this module and subsequent ones, allowing students to present the knowledge they have acquired in several different ways.

The greenhouse effect

Greenhouse gases are the main cause of climate change. The human-caused (anthropogenic) greenhouse effect is causing the average temperature of the earth's surface to increase. This has serious consequences for our environment, our economy and our society.

What is the cause of the greenhouse effect?

The earth's surface radiates reflected sunlight in the form of heat. Since our atmosphere only lets some of the heat radiation through, only a portion of the heat is immediately radiated into space. The rest remains behind, increasing the earth's surface temperature. Thanks to the natural greenhouse effect, the average global temperature is +15°C.

Without this natural greenhouse effect, the average global temperature would be around -18°C . However, at present humanity is significantly boosting the natural greenhouse effect by means of an anthropogenic one, i.e. one caused by humans. This is causing the average temperature of the earth's surface to increase, primarily as a result of greenhouse gas emissions.

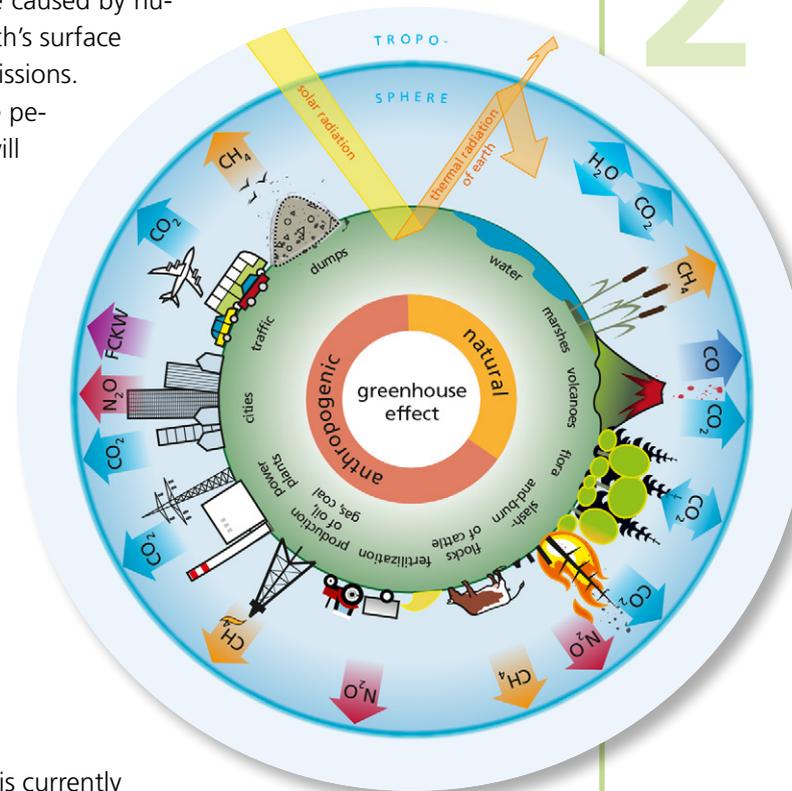
The IPCC Fourth Assessment Report estimates that in the period from 1990 to 2100 the average global temperature will increase by between 1.0°C (if climate policies are proactive and successful) and 6.3°C (if there is no reduction in greenhouse gases).

The anthropogenic greenhouse effect is caused by the emission of greenhouse gases, which reduce the amount of heat radiation that the atmosphere lets through. This means that less of the heat radiated from the earth's surface can escape into space, and as a result the earth becomes warmer. Sources of greenhouse gas emissions include fossil fuel combustion, agriculture and forestry, industry and waste disposal sites.

Are humans the sole cause?

There are also natural causes for the climate change that is currently taking place. As is well known, climate change also occurred in the past before humans could possibly have caused it. The ice ages are a good example of this. Natural causes include both internal climate fluctuations (e.g. as a result of oceanic circulation and its interactions with the atmosphere, as well as fluctuations in the atmospheric circulation itself) and external drivers (e.g. fluctuations in solar radiation or volcanic eruptions).

However, the majority of climate scientists believe that humans are the main cause of present-day climate change. The latest report by the Intergovernmental Panel on Climate Change (IPCC) states that it can be said with 95% confidence that human influence is responsible for current climate change: "It is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century" (IPCC Fifth Assessment Report). Global temperatures will increase in future, and human activities are reinforcing this effect.



Natural greenhouse effect

Carbon compounds and water vapour in the atmosphere act like the panes of glass in a greenhouse. They let light through, but prevent some of the heat radiation from escaping into space.

Anthropogenic greenhouse effect

Humans emit vast quantities of greenhouse gases, causing the natural regulatory processes to become imbalanced. This boosts the greenhouse effect and increases the earth's surface temperature.

Carbon cycle

Natural mechanisms regulate the emission and absorption of greenhouse gases. The atmosphere, seas, vegetation and soil absorb around as much CO_2 as they emit.

Greenhouse gases

CO	Carbon monoxide
CO_2	Carbon dioxide
CH_4	Methane
H_2O	Water
CFCs	

Tasks:

30
min.

- ▶ Research more information about the greenhouse effect online and produce a quiz with ten factual questions. Then swap your quizzes with each other and answer the questions.

10
min.

- ▶ In your own words, explain to the person sitting next to you how the greenhouse effect works. Try making a quick drawing to illustrate your explanation.

15
min.

- ▶ "[Climate Change 101 with Bill Nye](#)" is a short YouTube video that provides an introduction to the topic of climate change. Watch the video as a group and discuss it. What do you think of it? Try and think of any campaigns, adverts or songs you've seen or heard that deal with the topic of climate change. Can you think of any?

20
min.

- ▶ Look online for cartoons and/or caricatures, and spend a short time discussing them. You can find examples at:
seppo.net
politicalhumor.about.com (search for: "global warming cartoons")

What do you think of the examples you have found (funny, not funny, thought-provoking, good, not so good, etc.)? Everyone should print out the cartoons and/or caricatures that they have found and put the images on the floor. Then walk around and look at them. After around two minutes, each participant should pick a cartoon that particularly appeals to them.

Everyone should briefly describe their cartoon to the others and give short answers to the following questions: why did I choose this cartoon? What do I like about it or (perhaps) what annoys me about it? What ideas and associations does it contain for me personally?

10
min.

- ▶ Discuss in the class: What do you think about the approach of expressing information or thoughts about climate change in a creative form? Do you think this is a good way of getting a message across to people? Or is it better to be serious and factual?

What other ways can you think of to deal with the topic in a humorous yet informative way?

- ▶ Make some small cartoons, comics or humorous drawings of your own, or produce campaign posters and slogans that communicate information about climate change or messages about climate protection. You might want to get feedback from other people and then develop your work further. You can take photographs of particularly good work and post them online, distribute copies of the work at school or at youth groups, publish your work or submit it to the school magazine.
- ▶ You've put a lot of effort into compiling this valuable information, so don't just leave it lying in a drawer – make further use of it instead by sharing it with anyone else who's interested (the same applies for the other work you will produce later on)! This also allows you to make a contribution to climate protection – namely, keeping other people informed about it. Put up the posters you have made at your school or post photos of them online, write articles for the school or local community magazine or start your own magazine or blog about climate protection. The subsequent modules include other ideas for how to present information to other people in an interesting way.

30
min.accompanying
project

3

MODULE 3

Consequences of climate change

Geo

Eco

Bio

Lng

PP

C-S

Geeignet für die Fächer

Geography | Economics | Biology | Language (e.g. German) | Psychology and philosophy

Cross-subject projects

Overview of content for teachers:

Module 3 deals with the impact of climate change on people and planet. It is divided into two stages. In the first stage, the students acquire knowledge; in the second stage, the focus shifts to positive, future-oriented ways of responding to this knowledge. The young people are encouraged to come up with visions of the future and possible solutions.

This module includes the following methods: Discussion of students' own experiences, work with magazine articles, online research, imagining different scenarios, brainstorming visions of the future and ideas for solutions, creating a blog or social media account (Twitter, Instagram, etc.)

Global warming as a result of climate change has consequences!

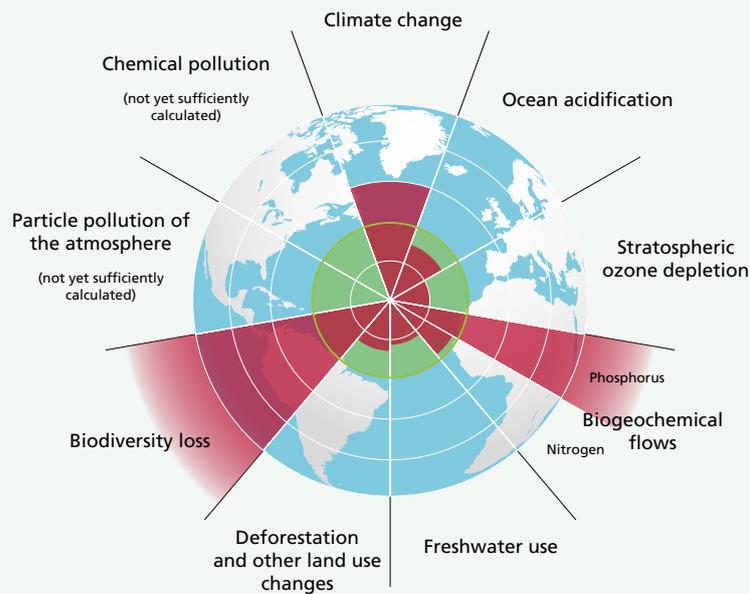
Our environment cannot adapt to climate change fast enough to keep pace with the rapid increase in the anthropogenic (human-caused) greenhouse effect. This may have devastating consequences for all humanity. The world's poorest countries will be especially badly affected. We can expect changes in water cycles and land and water ecosystems. Rising sea levels will impact negatively on millions of people in coastal regions, and glaciers and ice caps will continue to melt. Agriculture and the supply of food will be affected, as will human health.

In 2009, a team of scientists led by Johan Rockström published an article about the earth's ecological limits ("planetary boundaries"). The diagram below shows which of the nine central environmental problems are still within safe margins (green zone) and which have already exceeded these margins. What is less obvious in the diagram is the ways in which the individual risks interact.²

² Source: Sommer & Müller (2016). *Unter 2 Grad?*. Pp 94–98. S. Hirzel Verlag: Stuttgart. Information in English: <http://unter2grad.de/informations-in-english>

Planetary Boundaries

after Johan Rockström et al., 2009



Tasks:

- ▶ Think about it for a moment: have you already experienced any consequences of climate change in your own life? What were they?

Discuss your experiences with each other. Which experiences and observations are definitely due to climate change? Which ones are you less sure about? Why?

- ▶ You will all definitely have seen or heard a wide variety of reports about climate change on TV, on the radio, online and in newspapers and magazines. Collect newspaper reports, print out information from the Internet and cut out images relating to climate change from newspapers or magazines. Collect as much as possible. Sort through the material and arrange it into different areas: for example, effects on your country, effects on Europe and effects on the whole world. You should also mark which articles or images you regard as reliable and which ones you think might not be objective (for example, ones that exaggerate or downplay the problems, ones that are highly emotive, etc.)

15
min.

30
min.

15
min.

- ▶ Carry out online research to find out about the effects of climate change. You may find the websites of NGOs, factual magazines or government institutions helpful (e.g. WWF, National Geographic, gov.uk). Split into four groups. Each group selects one of the following four areas:

- Effects on land ecosystems
- Effects on water ecosystems
- Effects on agriculture and food supply
- Effects on human health

Identify the key facts about your area. Put the information in a suitable format for presenting it to the other groups afterwards (for example, posters or a PowerPoint presentation – or you may have your own highly creative ideas).

Present your results and findings to each other.

50
min.

- ▶ You will also have noticed that with the topic of climate change it's helpful to look at several sources of information in order to get all the facts. In "A Student's Guide to Global Climate Change", produced by the US Environmental Protection Agency, you can find more facts about climate change. Add the new information to the facts you have already gathered.

You can also find information in other videos, for example the short video documentary (12:40 mins) "[Our Changing Climate](#)", which you can find on the JacksGap YouTube channel.

50
min.

- ▶ The two faces of our future climate
Working in small groups, attempt to predict the future using the knowledge about climate change you have acquired so far: what will the world be like in the year 2100? Using this method, you can encapsulate alternative ideas about positive and negative developments in the future in the form of concrete scenarios. The key question behind this method is: "What would happen if ...?"

Each group begins by briefly discussing what they know about the current state of climate change. They then write these facts down (preferably on a large poster): what things are already changing as a result of climate change, and what things have not (yet) changed?

After that, each group discusses two scenarios in turn:

1. The sad face of our future climate: What would the world of 2100 be like if our worst fears about climate change came true? What world would your children and grandchildren live in? What would their lives be like?
2. The happy face of our future climate: What would the world of 2100 be like if all our hopes and dreams came true? What world would your children and grandchildren live in? What would their lives be like?

3

Create visual representations of both scenarios – you could make a poster or a collage (using the media reports and images you have already collected), draw pictures of the scenarios, get the members of your small group to act out the scenarios or create a static scene, or use sound/music to present the scenarios. There are no limits to your imagination and how you can express yourself.

Afterwards, create a small permanent exhibition of your work (with photos or copies of “transient” works such as scenes that you acted out) and look at the other groups’ work.

Then gather in your small groups again and brainstorm lots of ideas about two questions: What can we do to ensure that our fears do not come true? What can we do to ensure that our hopes – the earth’s happy face – *do* come true?

- ▶ Collect all the ideas from the different groups and list them on a poster together. When you’ve written down all the ideas, go through them again and mark them in three colours:

Red: This action can be put into practice very easily, by anyone and right away.

Green: This action requires patience and help from other people.

Yellow: This action can only be carried out by politicians or businesses (you might want to think about how and whether you could set these sorts of actions in motion – for example, by collecting signatures, contacting regional politicians, writing articles or letters for newspapers, etc.).

Agree on three actions that you will carry out and stick to during the next four weeks – and then start realizing them. Document your efforts on a blog, on a joint Twitter account or on a WhatsApp or Instagram account so that anyone else who is interested can find out about your experiences.

- ▶ Document your own experiences and anything you learn. You can use social media, for example a Facebook page/group or a Twitter or Instagram account. There are no limits to your creativity.

The following materials will provide you with enough information to continue your reports. A blog or social media account may also be run by the entire class or group. Each person could report on their own experiences of a particular topic, or different topics could be divided between different people. Other people will definitely find it interesting to hear about your experiences of climate protection.

Carry out your own research on a variety of channels to find inspiration. Look up social media profiles that are related to this topic or read several different blogs.

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min.accompanying
project

3

TIP: What's the right way to blog?

Blogging is an art in its own right. When you blog, you write posts for other people to read. How do you do it? Well, there isn't a fixed formula, but there are a few tricks that might help:

- Write about things that interest you.
- Short sentences, active language and direct speech make the text more exciting to read.
- Structure your thoughts. Always ask yourself what your readers don't know and what you want to tell them.
- Pay attention to how long your posts are. It's possible for them to be either too long or too short. Your blog isn't a text message: it's absolutely fine to write more than one paragraph of text. But at the same time, it's not an appropriate medium for an epic work on the scale of *The Lord of the Rings*. As a rule of thumb, good blog posts will fill somewhere between half the screen and the whole screen.
- Check your blog posts for mistakes before you publish them. With longer articles, it's best to take at least an hour's break before checking them.

You can find technical guidance on free blogging platforms at:
theblogstarter.com

Free blogging platforms:
creativebloq.com "The 12 best free blogging platforms"

4

MODULE 4

Adapting to climate change

Suitable for the subjects:

Geography | Economics | Biology | Language (e.g. German) | History | Social and political studies

Cross-subject projects

Overview of content for teachers:

In module 4, students learn about the topic of climate change adaptation and relevant measures and strategies at regional and global levels.

The following methods are used: Textual work, online research, formulating information and making posters in small groups, documentary videos, reflecting on thoughts and feelings as a group, documentation.

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C-S

How to adapt to climate change

Climate change is already well underway. Due to the inertia of the climate system, the effects of today's greenhouse gas emissions will only be felt in decades to come. Even a drastic reduction in emissions won't be able to change that. Following the agreement in Paris in 2015 to set a below-two-degree target for global warming, societies, politicians and businesses need to respond now and take precautionary measures. All modern climate policies have two goals: As well as striving to reduce greenhouse emissions, it is increasingly necessary to develop and implement strategies for adapting to climate change. However, climate change adaptation measures must not counteract measures for reducing emissions or vice versa.

Climate change adaptation aims to reduce risks and harms resulting from negative consequences of climate change now and in the future. Many different options are possible:³

³ (Source: Environment Agency Austria (2016). Konkrete Anpassungsmöglichkeiten. www.klimawandelanpassung.at/ms/klimawandelanpassung/de/anpassungandenklimawandel/kwa_moeglichkeit/kwa_konkret. Last accessed on 9 September 2016.)

4

Technological measures, for example building infrastructure to link water-poor and water-rich regions (establishing water boards)

Knowledge expansion, for example additional research funding to help improve data, providing information to ordinary people affected by climate change

Initiatives to change behaviour, for example encouraging people to use less water

Agricultural measures, e.g. using crop varieties that are more drought-resistant, using water-conserving methods of soil cultivation

Political initiatives, for example financial incentives for adaptation measures

Tasks

30
min.

- ▶ Look at the page on "[Climate change consequences](#)" on the European Commission website and then think about the following question as a group: What consequences of climate change are already inevitable (even if serious climate protection measures are taken that limit further escalation of climate change)? Make a list of these consequences. By yourself, think about measures that could be taken to adapt to these consequences or mitigate them. For example, one response to the higher indoor temperatures caused by hotter summers could be to install window shading devices.

30
min.

- ▶ Research online: In what areas are climate change adaptation measures needed? What measures are being proposed? Make a large poster with a grid like the one below by yourself and fill in the fields with the information you have found and your own ideas:

Example: Housing and construction

Area	Consequences of climate change	Possible adaptation measures
<i>Housing and construction</i>	<ul style="list-style-type: none"> • <i>Higher temperatures in the summer months – increased demand for cooling in homes</i> • ... 	<ul style="list-style-type: none"> • <i>Passive cooling (e.g. shading devices)</i> • <i>Alternative cooling technologies (e.g. ventilation systems that cool down inlet air by releasing its heat into the ground)</i> • ... <p><i>Please note: air conditioning generates additional CO₂ emissions due to its high energy consumption and is not a suitable way of adapting to climate change!</i></p>

Work in small groups and divide the different areas that you have identified during your research (e.g. housing and construction, healthcare, agriculture, etc.) between different people. Afterwards, present your results to the other groups and discuss them.

- ▶ Find out about the political plans and strategies for climate change adaptation that have been devised in your country, for example on the United Nations Environment Programme website at unep.org/climatechange/adaptation.

- ▶ Climate change will have far more drastic consequences in countries in the global south. Read the *Guardian* article "[Climate change will hit poor countries hardest, study shows](#)".

The *Guardian*'s short video documentary "[Climate refugees: the communities displaced by global warming](#)" (approx. 10 min.) also has lots of information on this topic.

What consequences will climate change have for countries in the global south? What problems stand in the way of developing and implementing adaptation measures?

- ▶ After you have acquired a general overview of the difficulties facing climate change adaptation strategies in countries in the global south, put yourself in the place of a person who lives in one of those countries. Write an open letter. What problems are you aware of? What support does your country require? Do you have any suggestions?

Search online for the term "climate witnesses" to find short video messages and profiles of people who are affected by climate change. Watch/read a few of these videos and profiles.

- ▶ Come together as a group and spend a short time checking how everyone is feeling. Take it in turns to give a short weather report in which you express your personal "weather condition" (how you are feeling and why, what you are thinking about) in a single sentence. For example: "The sun is shining for me because ...", "I see heavy rain-clouds ...". Is the overall mood in your group generally optimistic or generally gloomy? Briefly discuss the situation and what you can do.

- ▶ Document your mood and how it is affected by thinking about the effects of climate change. Put all the information you have acquired so far in a suitable format (blog, online post, poster, youth magazine, podcast, short video, presentation, etc.) and make it available to other people (the school, the local community, other youth groups, your parents, etc.). Think of effective ways that you personally can help – informing people is also an important way of contributing to climate protection!

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min.50
min.20
min.10
min.accompanying
project

5

MODULE 5

Carbon footprint: The marks we leave on the planet

Geo

Eco

FT

PP

Lng

C-S

Suitable for the subjects:

Geography | Economics | Food technology | Psychology and philosophy |
Language (e.g. German)

Cross-subject projects

Overview of content for teachers:

In module 5, students learn about the concept of carbon footprints. By using an online CO₂ calculator students can calculate their own greenhouse gas emissions and learn background facts and discover ways of reducing emissions. By getting the young people to engage with the full range of the topic and to attempt to come up with rough estimates of the emissions generated by different products, the module aims to give them a sense for the products and areas of life in which low/high levels of emissions are generated and where emissions could be cut in a relatively simple and efficient way.

The following methods are used in module 5: Individual and group work on students' own CO₂ emissions, textual work and estimating CO₂ emissions in groups, using an online CO₂ calculator, online research into background facts and climate protection measures, writing self-addressed letters in which the students describe three personal actions that they will undertake, "food miles" group breakfast.

What is meant by a carbon footprint?

Rising CO₂ emissions are the main cause of global warming. Each of us can make our own contribution to reducing or increasing CO₂ emissions.

A carbon footprint describes the level of greenhouse gas emissions (including CO₂, methane and nitrous oxide; see also the diagram on page 11) produced throughout the entire life cycle of a product or service. The unit that is being analysed is precisely defined: The packaging

for 500 grams of a product or the operations of an office over the period of one year. It's also possible to measure the annual carbon footprint of your own personal lifestyle.

The calculation of the footprint takes account of individual life cycle stages: Production including raw material extraction, processing, transport and sale, use and recycling/disposal all leave traces of CO₂ in the atmosphere. If using, reusing or recycling a product or service prevents CO₂ emissions, this counts as a "credit" that is offset against its overall carbon footprint. The results of a carbon footprint analysis are given in the form (roughly speaking) of a particular quantity of CO₂ equivalents in kilograms or tons.

Tasks

- ▶ Spend a little time thinking about when in your life you generate CO₂ emissions. Draw up a detailed list.

Compare your list with other people's lists. What things did you all include? Is it possible to identify different areas (e.g. home, travel, consumption habits, etc.)? Arrange the entries on your list according to these areas. If you realise you've forgotten certain areas, you can add them now.

- ▶ Try to estimate the carbon footprint of a product using the following method (remember it can only be a rough estimate – identifying the precise CO₂ emissions of a product requires meticulous research and complex calculations). Agree on a product where you have a rough idea of how it is made and answer the following questions: What main materials is the product made of? Where is it produced and how is it transported? Can the product be recycled? Write down the main stages that the product goes through during its life cycle. Now estimate the CO₂ emissions for each of the product's life cycle stages and assign ratings from 1 to 5 for each stage, where 1 means no CO₂ emissions and 5 means very high CO₂ emissions. This task will be made easier if you do a little research and think about or discuss the problem together. Finally, draw up an overall summary. Does the selected product have a very high carbon footprint or quite a low one?

Are there comparable products that have lower CO₂ emissions (perhaps products from the local region that don't have to be transported as far, or products made from a different material)? Would there be any downsides to buying the comparable product with the lower carbon footprint? Think about these questions and discuss them.

15
min.

30
min.

15
min.

- ▶ A CO₂ calculator shows you your personal CO₂ emissions and provides an overview of the consequences of different patterns of behaviour and consumption.

The WWF calculator covers the categories of “Food”, “Home”, “Travel” and “Stuff”. In the “Methodology” section at footprint.wwf.org.uk, you can read about what factors are included in the calculation.

How environmentally conscious are your consumption and travel habits? How sustainably do you live? Calculate your carbon footprint and compare your results with other people.

footprint.wwf.org.uk

20
min.

- ▶ On the results page, you’ll find general tips on actions you can take to be more eco-friendly. On the basis of your overall result and your individual results in the four categories, think about personal climate protection actions that you could take too. In your small group, discuss how you could put these actions into practice. Find four actions that you could easily carry out and write them down.

Use the calculator to test what effect it would have if you carried out these four actions and calculate how much CO₂ you would save as a result.

15
min.

- ▶ Write a letter or e-mail to yourself: Describe the three actions that you have come up with and their impact. How will you feel after you’ve kept doing these for three months? Briefly describe this feeling and congratulate yourself for sticking with it for so long. Put the letter in a stamped addressed envelope. Find a reliable volunteer who is willing to take all the letters and post them in a postbox in three months’ time or have someone send an e-mail after three months.

30
min.

- ▶ Divide into four groups (food, home, travel, stuff). Each group now concentrates on the category from the CO₂ calculator they have been assigned and meticulously researches background facts about their category. Answer the following questions: What are the challenges in this category? What solutions are there?

Hold a conference. Each group gives a short presentation on the information they have researched. The audience listens and then asks critical questions: What difficulties are there for the solutions? What’s the best way to implement these solutions?



plan
individually

- ▶ Think about what you ate for breakfast this morning and draw up a short list. Then write down where the individual products come from or where they were made. You may need to look at the packaging when you get back home in the evening before you're able to complete the list. Estimate the rough transport distances for each item on your list using distancr.com. Add all the distances together and compare the results with your classmates after that. Whose breakfast had to travel the longest distance?

Plan a joint breakfast for your class or group. Together, draw up a list of what everyone wants to buy. Divide the items on the shopping list between different people, or go shopping together. Try to think as little as possible about food miles when you go shopping and think about CO₂ emissions from other sources instead (e.g. refrigerating and storing apples from autumn until spring, or heating greenhouses for tomatoes in April). Look online for a guide to sustainable eating to help you. Of course there are some things you won't want to go without and you also have to pay attention to how much things cost.

Talk about how you found the shopping trip while enjoying a pleasant group breakfast with the rest of your class: Was it difficult to buy tasty and affordable food with a low carbon footprint? Did you deliberately avoid certain things? Did you discover any new products? Which products was it easy to find similar replacements for that had a lower carbon footprint?

At the end, calculate how far your breakfast travelled this time.

6

MODULE 6

My contribution to climate protection

Lng

PP

Geo

Eco

C-S

Suitable for the subjects:

Language (e.g. German) | Psychology and philosophy | Geography | Economics

Cross-subject projects

Overview of content for teachers:

Module 6 is about the question of how and what each individual can contribute to climate protection. The young people learn about the different things they can do and are encouraged to think about actions they can carry out in their own daily lives and how to actually put these actions into practice. It provides an initial introduction that aims to encourage the participants to develop their own ideas. Discussions on different (extreme) positions give the young people the opportunity to develop their own opinions.

The following methods are used in module 6: Short film, World Café, using an online CO₂ calculator, discussion of students' own habits and climate protection actions, textual work and discussion, thought experiments, conducting interviews.

Climate protection starts with each and every one of us!

The main goal of climate protection is to stop anthropogenic (human-caused) climate change. Climate change and climate protection start with each and every one of us. Our personal consumption and dietary habits and the amount of energy we all use directly affect the climate. In normal circumstances, anyone is able to support or reject measures carried out by governments, companies or local organisations. Climate change results from the sum of decisions made by all human beings, and so these decisions also form the basis for climate protection measures.

Tasks

- ▶ What can we do now to protect the climate and stop climate change? And above all: Who should do it? For an introduction to the topic, the group should watch the short YouTube video "[What YOU Can Do About Climate Change](#)" made by the Pacific Institute for Climate Solutions (PICS). After that you could discuss questions about climate protection in the World Café. In the World Café people sit around tables just like in a real cafe, talking about ideas and working together to find solutions. Four or five tables with four to eight chairs each are placed around the room and covered with packing paper. Pens are placed on each table and there may also be snacks and drinks.

Each table is assigned a discussion topic:

1. Climate protection is everyone's responsibility?! What can individuals do? What can societies, politicians and companies do? Does it make any difference if each individual takes small actions or are strategic political and economic decisions more important for achieving climate protection goals?
2. Everyone has the right to a car! Could and should everyone on earth have this right? What consequences would it have on the climate if everyone drove as much as Europeans and Americans?
3. What things or habits would I be unable or unwilling to give up?
4. Discussion about the film: What do you think of it? What is there to discuss? What do you think of it as a way of communicating information? What other methods or formats could be used to encourage people to think differently?
5. Depending on the number of participants there could be a table without an assigned topic. The people sitting at this table select the topic they want to talk about themselves.

Each table has a host who is responsible for greeting the new group each round and briefly explaining what their table is about. The World Café participants can sit at a total of three different tables of their choice across three rounds lasting 15 minutes each. In each round, the participants at each table discuss the topic and write down their ideas and arguments on the packing paper. An audible signal can be used to let them know when each round finishes. The hosts stay at their table and continue with the next group. At the end of the World Café the hosts present a report about the results and discussions from their table to the whole group. The packing papers from each table, now filled with ideas, could be put on the wall as posters.

- ▶ Based on the results of the WWF CO₂ calculator at footprint.wwf.org.uk, think about the following questions as a group: In what areas could you cut CO₂ and reduce your personal emissions? In what areas can this be done most efficiently (maximum CO₂ saving with minimum cost and inconvenience)?

How do I want to live and is it compatible with a carbon-neutral lifestyle? What things, habits and hobbies am I unwilling to give up? Which ones might I be able to change or do differently so as to reduce my CO₂ emissions?

6
60
min.

40
min.

25
min.

- ▶ Read the blog goingzerowaste.com and look online for similar articles and videos on this topic.

Think about whether there are any aspects of Kathryn's lifestyle that produce CO₂. If so, which ones and how much? Discuss in the group: What do you think of this lifestyle? What would the world be like if lots of people lived this way? Do you think that would be a good idea or not? Why not?

15
min.

- ▶ Carry out a thought experiment: "My life without CO₂ emissions". Could you continue to live the way you do now?

Would it be possible to live a normal life in our society or not? What do you think? Discuss these questions with each other.

30
min.

- ▶ Interview your grandparents about when they were young and about their CO₂ emissions. Before you talk to them, try to estimate: Have your grandparents generally emitted (produced) less CO₂ than you, the same amount or more (perhaps due to older technology, etc.)?

MODULE 7

Climate protection and politics

Suitable for the subjects:

History | Social and political studies | Language (e.g. German) | Geography | Economics

Cross-subject projects

Overview of content for teachers:

Module 7 is about the political options and measures that are needed to deal with climate change. The young people learn that structural measures are also of crucial importance and become acquainted with different perspectives and positions. In this initial introduction, students acquire knowledge of (industrialised) countries' greenhouse gas emissions and the global effects of these emissions. Discussions give participants the opportunity to consider other options and visions. In the subsequent module on international climate agreements (module 8), the young people then learn about political measures at an international level.

The following methods are used in module 7: Roundtable (roleplay), textual work and online research.

His

Pol

Lng

Geo

Eco

C-S

Who causes climate change and who does it affect?

While it's very important for every individual to take action in their own lives, in order to deal with human-caused (anthropogenic) climate change it's just as important that large-scale structural measures are taken at a political level. The success of climate policies depends on local and national efforts as well as international collaboration. The aim of climate protection is to reduce the speed and impact of global warming or, in the best-case scenario, to stop it altogether. Political measures are mainly concerned with reducing greenhouse gas emissions.

The highest CO₂ emissions come from industrialised countries. In absolute terms, China has now overtaken the USA as the country with the highest emissions. Drastic reductions are still needed in the per capita emissions of certain countries. However, it remains highly doubtful whether the target of keeping global warming significantly below two degrees (or even better: 1.5 degrees) can be achieved.

7

As a result of its economic upswing, China now has the highest CO₂ emissions in absolute terms. The per capita figures for the USA and Russia are still higher, but the absolute figures are alarming and are expected to rise further in the coming years. China, the USA, India and Russia are responsible for 50% of global CO₂ emissions from energy consumption. In 2007, the People's Republic of China overtook the USA as the world's biggest emitter for the first time; together, both countries were responsible for over 40% of global emissions.

One important fact about climate change is that the effects of greenhouse emissions are usually not felt in the places where they are generated but rather in completely different parts of the earth. For example, Africa is suffering the worst effects, such as famines, desertification and floods, despite having made the smallest contribution to global warming thanks to its low CO₂ emissions.

This means that in order to deal with climate change, international agreements (like the Paris Agreement that was signed in April 2016) are needed, with the participation of as many countries as possible. Following such agreements, the international targets are then implemented through national strategies in individual countries and, ideally, supplemented by countries' own initiatives and regional activities. You'll find more detailed information in module 8 (international climate agreements).

Tasks

50
min.

► Climate protection community roundtable

Putting yourself in the place of different interest groups helps you to understand other people's opinions and interests, and fosters a willingness to achieve a broad consensus.

Your local community wants to become a certified climate protection community. A roundtable on this topic has been set up with 14 interest groups. The participants now form small groups (two to three people per group), with each group representing a different interest group. In larger groups, the small groups may have more members, or extra roles (interest groups) could be created. In smaller groups, some roles may need to be left out.

During the first round of discussions, you should think about other arguments that can be used to make your case and come up with suggestions for possible collaborations. The aim is to take away a selection of proposals and plans from the first round of discussions and then have another discussion in your group about their feasibility. In the next round, you should present your results as creatively as possible. The financial costs that the different groups must bear are an important factor. Each group should explain how high these costs will be.

What are the different interest groups and what interests do they represent?

- **Mayor**

Only wants the climate protection community certification if as many people as possible participate in the project. Has good relations with the representatives of companies and institutions, and has a favourable opinion of the “Local Agenda 21” idea (civic participation projects for sustainable development).

- **School headmaster**

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

- **Farmers from the local region**

Financial aid is required to make the transition to organic farming. The farmers need to be able to rely on retail chains buying sufficient quantities of regional produce. Niche products require special support. Trading hours regulations must not restrict farms from selling their own produce directly. An adequate quantity of any organic waste that is collected must be returned to the farms to use as compost. Ideas for “holidays on the farm” could be developed in collaboration with tourism associations. Students could carry out holiday work placements at farms.

- **Forest managers from the local region**

Supply and demand for wood must be kept in equilibrium. Reforestation and utilisation of woodland requires good management. Use of wood in the region must not exceed certain levels. Educational trails could be set up in forests near schools. The forest managers are always available for school trips or woodland tours.

- **Tourism companies**

Climate protection regulations must not have a negative impact on tourism. If the regulations are too drastic, holidaymakers might stay away or tourism companies’ operating costs might become too high. Public transport needs to be well organised so that visitors can leave their cars at home. Popular tourist destinations need to be readily accessible too, especially during peak seasons. The region as a whole must promote itself to the ecotourism target group. The companies are willing to provide teachers with any information they need about running an ecotourism business and to offer work placements to students.

- **Transport companies**

Expanding local public transport would require financial support. The companies are worried that if they offer additional services, they won’t be used. There might be opportunities in conjunction with other existing organisations and services, such as post buses.

Connections to cross-regional public transport networks like the rail network need to be ensured.

7

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

Additional staff training on renewable energy and sustainable products needs to be organised and funded. The companies are willing to take on a portion of the costs. In addition, training for girls needs to be specially promoted. This requires support from schools and public institutions, as well as dedicated promotional activities.

- **Architects**

Are increasingly called on to use passive and zero-energy building technology in new-builds. For renovation projects, they need to apply the necessary expertise and work closely with installation companies.

- **Waste management companies**

Would be willing to actively participate in an information campaign on separating and reducing waste, but the costs need to be shared. They require financial support to update their operations with the latest environmentally friendly technology. If necessary, they can take out a loan from the regional bank.

- **Retail chains, shops**

Are willing to offer regional products as long as they don't make a loss. The products should be jointly promoted by stores and local institutions, and the costs should be shared. Consumers should have the opportunity to see the places where the products are sourced "with their own eyes".

- **Banks**

Are willing to provide low-cost loans to support environmentally friendly projects. However, they are not charities and have to think about profits.

- **Scientific consultants specialising in regional development and energy/material flow analysis**

Responsible for assessing and monitoring existing structures, feasibility analyses for future projects, air and water quality measurements, soil sample analysis, etc. Their work has to be externally financed, as the university is dependent on third-party funding. The project also offers an educational opportunity for students.

- **Interested/affected citizens**

Homebuilders want to build homes in a way that is economical and environmentally friendly right from the outset. Owners of existing buildings don't want to have to carry out costly renovations, unless they receive support from local government and public institutions.

- **Manufacturing companies**

These companies are concerned that stricter environmental regulations could bring high costs that would cut into their revenues. The companies argue that they create jobs in the region and would consider leaving if conditions became more restrictive.

After the two rounds of discussions are complete draw up a short summary in your group: How did things go for you personally in your role? How satisfied are you with the results of the discussions? How did you find the discussion process? Do you think it would make sense to hold these sorts of roundtable discussions in the real world?



50
min.

- ▶ Research and collect information on all the continents: Which countries are the biggest CO₂ emitters? What effects of climate change are already evident today in different continents? Divide up the continents and work in small groups. Make posters and present them to the other groups.

On the following websites, you can find information about the effects of climate change in countries in the global south. Click through to the different sections or search for keywords:

[oxfam.org](https://www.oxfam.org)

[care.org](https://www.care.org)

You could also look for other sources too, of course.

8

MODULE 8

International climate agreements

His

Pol

Lng

Geo

Eco

C-S

Suitable for the subjects:

History | Social and political studies | Language (e.g. German) | Geography | Economics

Cross-subject projects

Overview of content for teachers:

In module 8, the young people learn about political measures being taken at an international level. This aims to awaken an active interest in climate politics. The various opportunities for discussion help them to form their own opinions.

The following methods are used in module 8: Textual work, acquiring information from short videos, discussion with preparation (collecting for and against arguments), compiling, documenting and presenting the results and products of their work.

The international climate process

The global community has been working on the issue of climate change for over 20 years. At the United Nations Conference on Environment and Development in Rio de Janeiro (Brazil) in 1992, the United Nations Framework Convention on Climate Change (UNFCCC) was agreed. This was the first official climate protection treaty. 180 countries signed Agenda 21, an action plan for sustainable global development in the 21st century. A climate conference has been held every year since 1995.

At the climate conference in Kyoto in 1997, a second treaty – the Kyoto Protocol – was agreed. The treaty obliged all industrialised countries (except the USA, which did not ratify the protocol) to reduce their greenhouse gas emissions in the period from 2008 to 2012. Subsequent climate conferences were primarily focused on extending the Kyoto Protocol. The follow up, Kyoto II, was finally agreed in 2012 after several years of negotiations (see below for more information).

Recent climate conferences have primarily focused on fleshing out the concrete details of a comprehensive global climate agreement to succeed the Kyoto Protocol from 1997. The

global climate conference in Copenhagen (Denmark) in late 2009 was supposed to agree such a treaty, but expectations were too high: stark differences in outlook between industrialised countries and countries from the global south prevented an agreement from being reached at that stage. After Copenhagen, the global community resolved that from now on they would work more gradually towards the goal of a new climate agreement.

Accordingly, negotiations on the future of a global climate agreement only proceeded in a piecemeal fashion at the climate conferences in Cancún (2010), Durban (2011), Doha (2012), Warsaw (2013) and Lima (2014): the Kyoto Protocol was extended until 2020, the maximum level of global warming was set at 2°C, a forest conservation programme was set up and a specific schedule for a future global climate agreement was established. The main points of contention during the negotiations concerned the financing for aid funds and the stringency of the targets.⁴

The 2015 climate conference in Paris has been described as a milestone in the history of climate protection. After relatively underwhelming results at climate conferences in the preceding years, the conference in Paris is regarded as a breakthrough moment on the path to a collective global climate agreement (see below for more information).

The Intergovernmental Panel on Climate Change (IPCC) was founded at the 1988 Toronto Conference. The IPCC acts as a scientific advisory body for international climate policy. It analyses research findings from different disciplines and publishes an assessment report around every five years. The full version of the Fifth Assessment Report was published in 2014. It consists of three sub-reports (“The Physical Science Basis”, “Impacts, Adaptation and Vulnerability” and “Mitigation of Climate Change”) and a summary for policymakers. It contains forecasts for the coming decades.

The Kyoto Protocol (2008–2012)

The Kyoto Protocol was agreed in 1997 and came into force in 2005. It was the first climate agreement that was binding under international law. 191 countries ratified the Kyoto Protocol in its first commitment period. The aim was to reduce emissions of six greenhouse gases by an average of 5.2% in the period from 2008 to 2012.

Since the treaty took account of the fact that industrialised countries are responsible for a majority of global greenhouse gas emissions, no emission reduction targets were set for developing countries. Accordingly, the requirements only applied to industrialised and emerging countries (also known as Annex I countries).

⁴ Source: Wikipedia (2016). United Nations Climate Change conference. https://en.wikipedia.org/wiki/United_Nations_Climate_Change_conference. Last accessed on 9 September 2016.



Three “flexible mechanisms” formed the core of the Kyoto Protocol. They were intended to facilitate financing of climate protection measures. The basic principle was to allow emission reduction measures to be carried out in the places where it was most cost-effective, not necessarily in the places where the emissions were generated.

1. **Joint Implementation**
Under this mechanism, an Annex I country can invest in an emission reduction project in another country. In return, the first country receives a portion of the reductions that are achieved there in the form of emission reduction units. These ERUs count towards the country’s own carbon reduction targets.
2. **Clean Development Mechanism**
Under this mechanism, an Annex I country invests in an emission reduction project in a developing country and receives certified emission reductions. These projects are supposed to support transfers of environmentally friendly technologies to developing countries and make a contribution to sustainable development.
3. **International Emissions Trading (IET)**
Annex I countries are allowed to trade emissions certificates with each other. If a country produces more CO₂ than its certificates permit, it can purchase additional emissions certificates from other countries.

The Kyoto Protocol faced a lot of criticism, not least because global emissions continued to rise during this period (by almost 30% compared with 1990). The rapid development of emerging economies such as India and China is believed to be one reason for this.

Kyoto Protocol II (2013–2020)

At subsequent climate conferences, negotiations were held on how to extend the Kyoto Protocol. Of the 191 UN member states that signed the original agreement, only 37 states have agreed to binding targets in the second commitment period. These countries are responsible for around 15% of global CO₂ emissions between them. The commitment period runs from 2013 to 2020, when the new international climate treaty that was agreed in Paris comes into force. The new treaty once again covers all countries.

The participating countries commit themselves to reduction targets. The target for the EU is a 20% reduction in greenhouse gas emissions compared with 1990 (this target has already been achieved).

However, the countries that are responsible for the most CO₂ emissions, such as China, the USA, Russia, Japan and Canada (which withdrew from the treaty in 2011), did not sign up to the Kyoto Protocol’s second commitment period. As a consequence, they also ceased to make financial contributions.

New measures in Kyoto II include a review mechanism and an adaptation fund for developing countries. Emission trading was also restricted, and another greenhouse gas (nitrogen trifluoride, NF_3) was added to the list of greenhouse gases included in reduction targets.⁵

Paris Agreement (2015)

Efforts in recent years to establish a global climate agreement finally met with success at the 21st climate conference in Paris (aka COP21) in December 2015. The agreement was signed by 196 parties (195 countries and the EU) in New York in April 2016. However, at least 55 countries responsible for at least 55% of global greenhouse gas emissions also need to ratify the agreement in order to give it legal force.

The treaty aims to restrict global warming to significantly less than two degrees, or ideally to 1.5 degrees. Initially, countries will work towards this aim by reducing emissions. In the second half of the century (from 2050 onwards), the treaty aims to achieve greenhouse gas emissions neutrality. Roughly speaking, this means that CO_2 emissions (e.g. from fossil fuel combustion, agriculture, etc.) will be equal to CO_2 absorption (e.g. by oceans and forests) so that they cancel each other out. Since the countries' national plans for reducing greenhouse gases are insufficiently ambitious to meet the below-two-degrees target, progress on this front will be reviewed every five years by industrialised, emerging and developing countries alike.

Although the agreement is legally binding, there are no sanctions for infringements. Financial contributions and national CO_2 emissions limits were not included in the binding portion of the treaty. However, the treaty calls on industrialised and emerging countries to provide financial aid for climate protection measures in developing countries.⁶

Tasks

- ▶ Work through the informative text about international climate politics and underline the key facts. You can find a short summary of the climate conference in Paris on YouTube: "[COP21 Agreement: Explained](#)".

30
min.

⁵ Sources: German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (2016). Kyoto Protocol. www.bmub.bund.de/en/topics/climate-energy/climate/international-climate-policy/kyoto-protocol. Last accessed on 9 September 2016.

3sat (2012). Minimale Ergebnisse. www.3sat.de/page/?source=/nano/umwelt/166296/index.html. Last accessed on 9 September 2016.

KlimaJournalisten UG i.G. (2013). Kyoto II mit viel Verspätung. www.klimaretter.info/klimakonferenz/klimagipfel-warschau/countdown/15000-kyoto-ii-mit-viel-verspaetung. Last accessed on 9 September 2016.

⁶ Sources:
German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (2016). Übereinkommen von Paris. www.bmub.bund.de/fileadmin/Daten_BMU/Download_PDF/Klimaschutz/paris_abkommen_bf.pdf. Last accessed on 9 September 2016.
Wikipedia (2016). 2015 United Nations Climate Change Conference. https://en.wikipedia.org/wiki/2015_United_Nations_Climate_Change_Conference. Last accessed on 9 September 2016.

30
min.

- ▶ The Kyoto Protocol didn't achieve the desired effect and was widely criticised. Research the various criticisms and weaknesses of the Paris Agreement online and write a list of them. Then discuss them in the class. Do you think the criticisms are justified? What do you think was good about this agreement? What was less good? Do you think the Paris Agreement can work?

20
min.

- ▶ Since industrialised countries have historically been the main causes of today's climate change, whereas it is developing countries, including island nations, African countries and parts of Asia, who are currently suffering most of the harm of climate change, these latter countries are demanding compensation from the rich nations. What do you think of this demand? Is it justified or is it going too far? Watch the short video "[How does climate change hit poor countries?](#)" on EurActive.com. Split into two groups and present arguments from the perspectives of industrialised and developing countries respectively.

20
min.

- ▶ The Paris Agreement is legally binding, but there are no financial penalties for violating the agreement. Do you think this arrangement makes sense? What would you suggest? What might motivate countries to uphold the agreement despite the lack of financial penalties?

30
min.

- ▶ Signing a treaty alone is not enough to save the world. Split into five groups. Each group should choose one country. Research what measures this country is taking on the issue of climate change in order to meet the Paris Agreement targets. Then each small group should present their national strategic plans to the group as a whole.

Other YouTube videos on the topic of climate change and the international climate agreement:

[Climate change explained in under 2 minutes](#)

[What is climate change? – Met Office climate change guide](#)

[The Paris Agreement for Climate Change](#)

MODULE 9

Climate protection and the economy

Suitable for the subjects:

Economics | Geography | Language (e.g. German) | Psychology and philosophy

Cross-subject projects

Overview of content for teachers:

In module 9, students learn about the topics of climate change and the economy. The young people think about what responsibilities businesses have and how they could contribute to climate protection.

The following methods are used in module 9: Textual work, planning and carrying out a trip, online research, (group) discussion on controversial articles, developing visions of the future.

Eco

Geo

Lng

PP

C-S

From throw-away to circular economy

What role does the economy play in connection with climate change? How could the economy actively contribute to solving the problems caused by climate change? Our current economic model is based on constant economic growth, which in turn is based on the consumption of resources. However, infinite growth is not possible on a planet with finite (non-renewable) resources. Nowadays, we live in a throw-away economy in which we produce and consume resources that are either converted into a form that is no longer usable (e.g. oil, gas and coal for energy production) or are thrown away after use (waste). Many industrialised countries already recycle some of their waste, but the proportion of resources that are recycled is only equivalent to a fraction of the new non-renewable resources that continue to flow into production processes.

9

Switching to a circular economy modelled on natural metabolic cycles in which the resources that we use are fed back into the production cycle could solve this problem. Instead of burning resources or throwing products away at the end of their life cycles, almost all resources could be reused. The recycling rate would significantly increase and the proportion of new resources that would need to be fed into the production cycle would sharply decrease. Accordingly, one element of the circular economy is energy transition. This means that the use of non-renewable resources (which can only be used once) such as coal, gas and oil to generate energy would be minimised and replaced by renewable resources such as water, wind and sunlight. A circular economy aims to reduce emissions and waste to the bare minimum.

However, our current production processes and consumption habits are not configured for this kind of economy. In a functioning circular economy, products would need to be manufactured in a way that makes it easier to replace individual components if the product malfunctions and that allow products to be reused. Moreover, products wouldn't just need to be made in a different way – the materials used in products would need to be fundamentally rethought too. From mobile phones based on replaceable modular systems to compostable T-shirts, the possibilities are endless. Consumers would no longer own products, but would instead hire them from the manufacturer for a specific period of time. This would ensure that products such as old washing machines would not end up in the dump but would instead be returned to the producers, who would then have an interest in reusing individual components (in order to save costs and resources).

As consumers, each of us can help to shape the face of the future by choosing not to use disposable products and instead opting for ones that are made in a socially just and environmentally friendly manner. The greater the demand for such products, the more likely producers will be to manufacture them.⁷

Tasks

15
min.

- ▶ Take a pen and a small piece of paper. Think about the concepts of “the economy” and “climate change” and spontaneously draw an emoticon on the piece of paper. You can choose whatever expression you want depending on what associations you have with these concepts. Everyone in the group should briefly explain to the others what expression their face has and why, and what thoughts they had about the two concepts. Stick your emoticons onto a poster. Each person should label their emoticon with a key word that expresses their thoughts. Arrange the faces according to their emotion so that you can get an overview of the group's mood in relation to this topic.

Briefly discuss the following questions: Is the group generally positive or negative about the topic of the economy and climate change? Do you feel helpless and powerless in the face of the economy, or do you think every single individual has a certain amount of power to change the shape of the economy? In what ways do you think the economy and businesses could make a significant contribution to climate protection?

⁷ Source: Wikipedia (2016). Circular economy. https://en.wikipedia.org/wiki/Circular_economy. Last accessed on 9 September 2016.

30
min.

► Read through the article above and underline the key facts. The cradle-to-cradle principle is one example of an idea based on the circular economy. The name contrasts with the “cradle-to-grave” production and consumption habits that we currently have in our throw-away economy. Research this principle online, for example at epea-hamburg.org (search term: “cradle to cradle”) and discuss the following questions in the group:

- What do you think of the idea of the circular economy?
- What does the cradle-to-cradle principle mean?
- Have you ever had any experience of the circular economy or the cradle-to-cradle principle (for example, as a consumer)? Do you know any examples of them?
- Are there any existing products you hadn't previously heard of that have been designed in accordance with the cradle-to-cradle principle?
- What ideas do you have for products made in line with the circular economy/cradle-to-cradle principles?

► Look for companies in your area that operate in a sustainable, environmentally friendly way and agree on one that sounds interesting and that you would like to visit. Plan a trip to visit the company. Before the trip, prepare a list of questions that interest you. Document your trip and the information you acquire during the trip using a suitable format (e.g. blog, video, podcast, article or report, a story told with photos, etc.).

► It's not just as a consumer that you can make a difference, but also as an employee or freelancer. Businesses often talk of “green jobs”. This term refers to jobs involving (the manufacture of) products, technologies and services that prevent damage to the environment and help to conserve natural resources. Research online to find out about the different green jobs that are available – for example, you can find an overview on the website jobsingreen.eu.

Are there any green jobs that interest you and that you could imagine doing? If yes why? If no why not? Discuss it with each other.

Some of you will work during the summer holidays to earn some money and gain valuable experience of the world of work. Or maybe you'd like to volunteer for an environmental organisation during your gap year. Yes, green jobs offer that opportunity too! If you're interested, you can find out more online.

3–4
hrs.20
min.

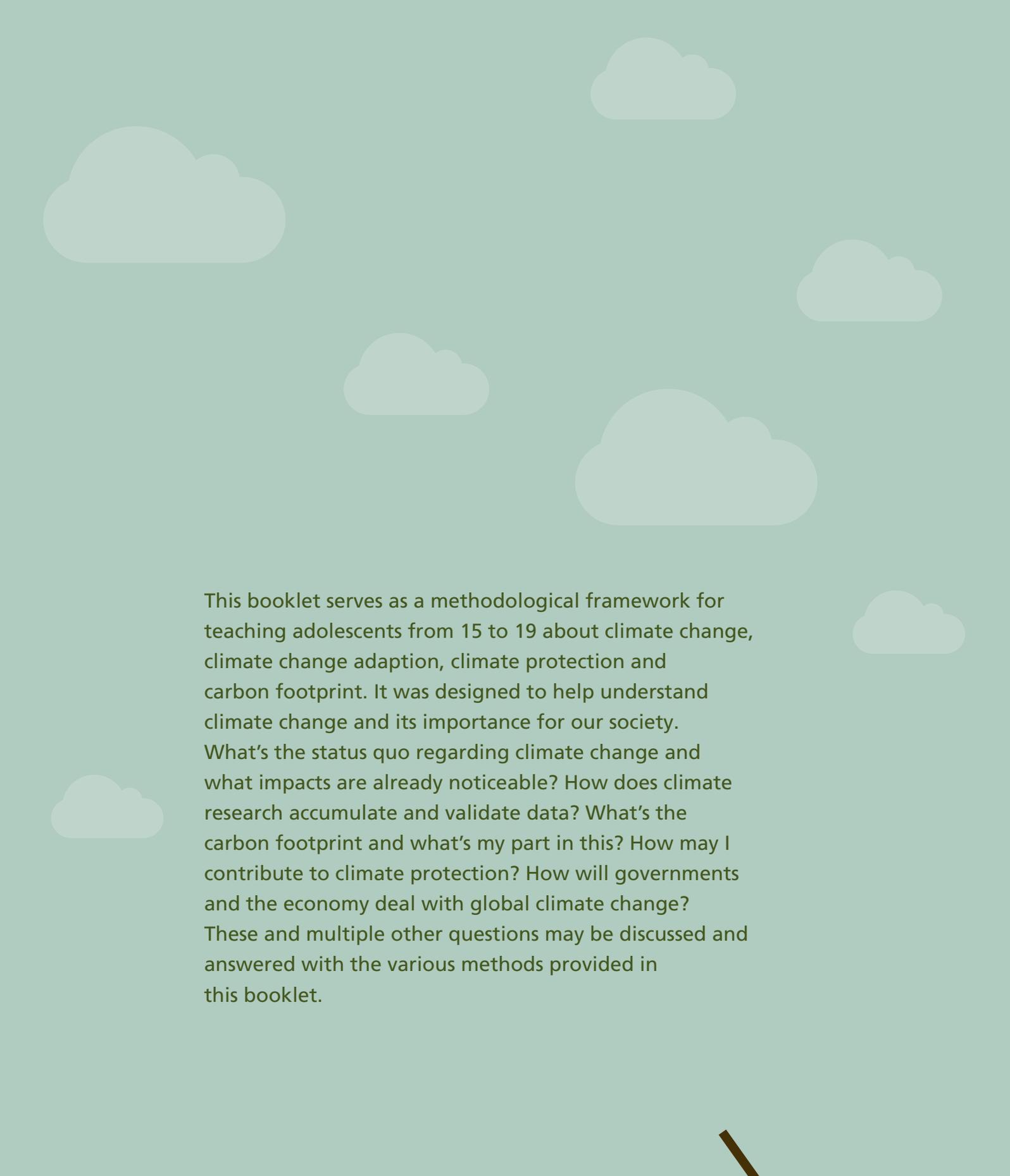
15
min.

- Not all the news about the economy/businesses and climate protection is positive. At home, read about the *Guardian's* "[Keep it in the ground](#)" campaign. Discuss in your group:
- What do you think about this campaign?
 - According to this campaign, what companies are part of the problem and which ones are part of the solution?
 - What is divestment?
 - Should independent newspapers launch campaigns?
 - What does this article teach you in general about how we should respond to the media?
 - To what extent do media outlets influence our attitudes and opinions?

60
min.

- What will our future be like? Come up with three different scenarios for how the economy is responding to climate protection in 2016:
1. A best-case scenario
 2. A worst-case scenario
 3. A no-change scenario ("keep on going the same as before")

Create a visual representation of each of these scenarios. You can be as creative as you like (for example, you could make collages, pictures, comics, etc.). Then display your work in the classroom or post it on a blog or on social media. At the end, come to a collective verdict: how likely are the different scenarios? How can you help to make the best-case scenario a reality? Record your ideas in a list of possible actions.



This booklet serves as a methodological framework for teaching adolescents from 15 to 19 about climate change, climate change adaptation, climate protection and carbon footprint. It was designed to help understand climate change and its importance for our society. What's the status quo regarding climate change and what impacts are already noticeable? How does climate research accumulate and validate data? What's the carbon footprint and what's my part in this? How may I contribute to climate protection? How will governments and the economy deal with global climate change? These and multiple other questions may be discussed and answered with the various methods provided in this booklet.

