

Lesson 2 - Theme 1. Climate Change

Teacher guide - Ages 11-14

Preparation

Review the lesson material and watch the videos before the lesson. Do some preparation on the topic. For the Outdoor Experience some materials are required. Feel free to add any resources or materials you have available to enrich the lesson.

Learning Goals

The students ...

- learn what climate change is.
- know there is a difference between natural climate change and climate change caused by human activity
- know the cause and the consequences of global warming
- will become acquainted with solutions to counteract climate change
- will know what they can do to help prevent global warming
- want to tell others what they learned.

Key Vocabulary

- the climate change
- the environment
- the desertification
- the carbon cycle
- the atmosphere
- the greenhouse effect
- the emission
- carbon dioxide
- Pollute
- the temperature rise

Introduction

[Slide 3-5]

Ask: Have you ever ordered anything online [together with your parents? What are the reasons to buy online instead of going to the store? Possibly share your own experiences about online shopping here. Discuss what happens from the moment you click the order button to the moment the package is delivered. What route does a package take?



Make exercise 1 together on the interactive whiteboard and discuss it. Afterwards, discuss the learning goals of this lesson.

Instruction

[Slide 6-8]

Issue

Ask the students what climate change is according to them.

Explain different causes of climate change:

- *climate change due to natural causes.*
- *climate change due to human activity.*

What activities are we talking about? Think about burning fossil fuels: oil, gas and coal. This causes more CO₂ emissions and therefore the global temperature rises. The increase of methane is caused partly by agriculture (for example cows and rice fields. People use more and more energy.

Refer to the exercise you discussed during the introduction. (Think about excess packaging and also delivery vans for example.)

Complete exercise 2 together on the interactive whiteboard and discuss it.

Discuss examples of consequences of climate change:

- *The global temperature rises.*
- *There is more extreme weather (extreme downpour, tropical storms, etc.).*
- *Dry areas turn dryer. There is desertification, which causes problems for agriculture and water supply.*
- *Because of global warming, the sea levels are rising. This is caused firstly by melting ice sheets and glaciers, which releases more water in the oceans and the seas. Secondly, the sea levels rise because of the heat on earth. This causes the water temperature to rise, which causes the water to 'expand'. Because of the rising sea levels, there are more severe floods.*

[slide 9- 14]

Discuss why the climate changes. Explain it and/or watch the video.

The climate changes because people disrupt the natural cycle of carbon. In everything we do - driving a car, buying clothes, having factories mass produce goods - we produce carbon dioxide. There is carbon in carbon dioxide. Carbon can be found everywhere on earth.

Volcanoes are an example of natural sources that emit carbon dioxide when they erupt.

Oceans don't just absorb water and warmth, they also absorb carbon dioxide and since they are spread all over the earth they act as a sort of climate controller.

Plants and trees also absorb carbon dioxide. (And when trees are cut down, carbon dioxide is released).

Because people need energy, we disrupt this cycle: we use fossil fuels from the earth (like oil, gas, coal) and burn these to generate energy. There is too much carbon dioxide in the atmosphere. It can't all be absorbed by trees or dissolved into the oceans anymore. Complete exercise 3 and 4 together on the interactive whiteboard and discuss them.



[Slide 15-20]

Discuss the term greenhouse effect.

What causes global warming? (the greenhouse effect). There are greenhouse gases in the atmosphere like carbon dioxide, which trap the warmth on earth. This is the natural greenhouse effect: the gases hold the warmth (like the structure of a greenhouse). That is good, because otherwise, the Earth would be way too cold. But an excess of greenhouse gases causes the global temperature to rise.

Because we have been measuring temperature for more than a 100 years, we know that the global temperature is rising, the oceans are warming up and the ice sheets are melting.

Complete exercise 5 together on the interactive whiteboard and discuss it.

[Slide 21-24]

A solution

What can we do to make a difference?

Explain the following solutions:

- *Emit less carbon dioxide (later on you will discuss how)*
- *Plant more trees*

Do the students know how trees and plants can help?

Trees get carbon dioxide out of the air. They turn this into oxygen and biomass (like wood, leaves and roots). Specifically while growing, trees store extra carbon dioxide.

To help the climate we all have to try to reduce the carbon dioxide emission.

It is not possible to emit no carbon dioxide at all. Make and discuss exercise 6.

[Slide 25-26]

What can you do?

Tell the students that they now know a lot about climate change and that they can also make a difference. For example they can share this information, but they can also change things in their lives (together with their parents) and create awareness. Look at the video together.

Make exercise 7 together on the interactive whiteboard and discuss it.

Suggested related themes

Theme 8 about trees relates to the solutions against the greenhouse effect.

Worksheet

[Slide 27]

Assign the worksheet. Discuss the exercises on the worksheet. If the students work together on exercise 2, the groups can present their answers. The drawing of exercise 3 can be made on a different sheet. Hang all the drawings together and discuss with your students which drawings represent the greenhouse effect best. Exercise 5 shows that some people deny the problem.



What do the students think about this? What can be done against this? In exercise 6, you can discuss your own measures. Is there an electronic appliance in the classroom or at school that is not used regularly or not used at all? In exercise 7 you can discuss the rules. All the students can share their opinions.

Practical Assignment

[Slide 28]

Make a collage about climate change. With the collage you can tell others more about his subject.

Closing

[Slide 29]

Discuss the learning goals and make an appointment with the students about how and when they can continue their practical assignment (making a collage). Organise a moment where they can be presented/shown.

Outdoor experience

[Slide 30]

Give the students the following exercise:

Take a look at the local weather forecast. Do some research and share your findings with your class.

- How is it possible that we can predict the weather so far in advance?
- Why is it important to be able to predict the weather so far in advance?
- What is the difference between 'weather' and 'climate'?

Extra

[Slide 31-36]

Exercise 1

Let the students react to statements.

- It is still cold in the winter, so there is no such thing as global warming.
- There is no use in trying in our country if other countries and continents are not making any changes.
- Children can't do anything to stop climate change.

Exercise 2

Look for a film or series about the theme climate. Which titles can you find? Is there one that interests you? Choose one film or episode of a series that you could look at with your class or at home.

Extra films and songs (in the interactive whiteboard lesson).



Material

For the collage: cardboard, pictures, images, A4-paper, pens, pencils, glue, scissors and adhesive tape.

For the outdoor experience: handout.

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Answer Key - Ages 11-14

Exercise 4

Flight shame:

To be ashamed to book a flight (because travelling by train is better for the environment for example).

