

Why the ice is melting:

Make the greenhouse effect visible!

Materials and equipment:

- 2 plates or saucers
- 2 equally sized ice cubes
- 1 clear and thin-walled drinking glass
- sunlight



The experiment

- Place the two plates side by side in a place where the sun is shining and the wind is as calm as possible.
- Place an ice cube on each plate and cover one of them with the drinking glass.



It is important that both plates are equally illuminated by the sun and that the ice cubes are placed on the plates at the same time!



- Wait for a few minutes and check the ice cubes again and again. After about 15 minutes – depending on how strong the sun is shining and how large your ice cubes are – something should have changed.

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Observation:

- If you can't tell the difference yet, wait a little longer. Wait at least until the first ice cube has melted completely.

What has happened?

- The ice cube that is under the glass melted first.
- The ice cube without a glass melted first.

Do you have an idea what could be the cause of this?



It has got to do with the greenhouse effect!





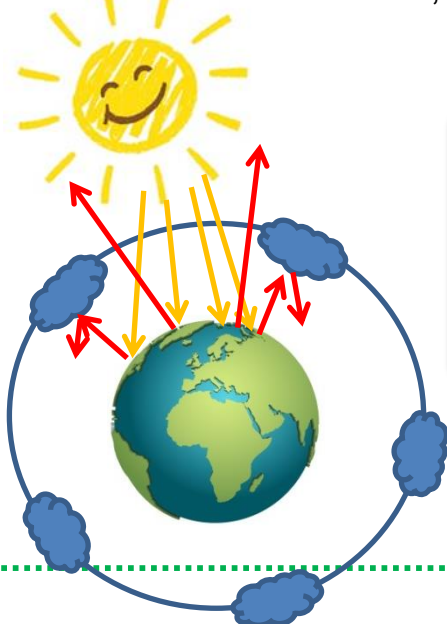
What is the greenhouse effect?

If you followed the instructions, the ice cube under the drinking glass should have melted a little faster. This is due to the so-called greenhouse effect: sunlight can pass through the glass to the ice cube and the energy of the light heats up the air under the glass. This makes it become much warmer under the glass: Light energy turns into heat energy, as you may have already found out in the experiment for the solar thermal power station.

The warm air cannot escape because of the drinking glass and so it makes the ice cube melt faster.

What has this got to do with the climate of the earth?

The greenhouse effect of the earth works much like the experiment. The earth's atmosphere with its greenhouse gases forms a layer around the earth that is comparable to the glass from our experiment. They let the sun's rays through, which warm the surface of the earth. The heat from the earth's surface is then held inside by the layer of gases, which consists of carbon dioxide, among other things.

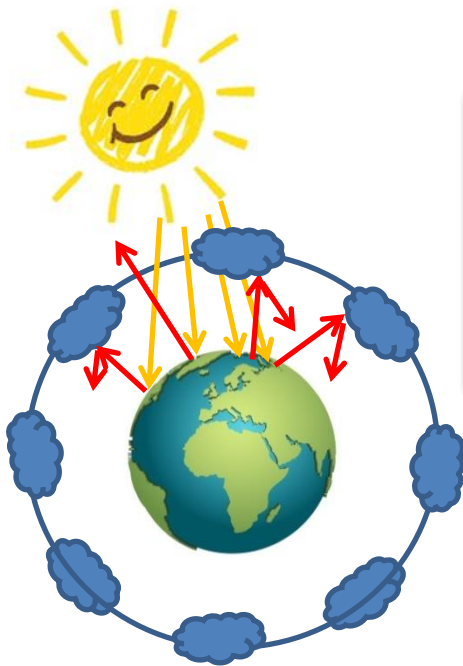


This is how you can picture the natural greenhouse effect: heat partly remains in our atmosphere and partly escapes into space.



What has this got to do with humans?

This effect is not only bad – without it, it would be pretty cold on Earth. However, the recent high emissions of carbon dioxide mean that the gas layer – effectively the glass from our experiment – lets less and less heat out, so that the air around us is heating up quickly and in an unnatural way. Carbon dioxide is formed for example when we drive our cars or heat our houses.



This is how humans have an impact on the natural greenhouse effect: The more carbon dioxide we produce, the hotter it gets because less heat can escape!

In one of our next experiments you will find out what this can lead to. For now keep in mind:



To avoid it getting too warm, rather choose to take the bike!