

Grassroots Environmental Education
Kids Discovery Series
Module Two: Climate Change
Written by Abby Bezrutczyk

Introduction

The weather can change pretty dramatically from day to day; sometimes you wake up to stormy skies and cold rain and on other days, it's sunny and warm. But while the *weather* changes everyday, the *climate* doesn't usually change that much.

What's the difference between weather and climate? Climate describes the general weather, like saying that Antarctica is usually cold and dry, and a tropical rainforest is usually hot and wet, and New York is usually somewhere in the middle.¹ You determine the climate of a place by looking at the weather over a long period of time.

But now, not only is the weather changing, but the climate is also changing. And it's because of things humans are doing to the environment, like burning a lot of fuels and cutting down trees.

Why is the climate changing?

To get to the bottom of why the climate is changing, we need to talk about those fuels, called "fossil fuels." And in order to do that, we have to go way back in time. About three hundred million years ago, way before any people were around, our planet looked like nothing you've ever seen before. Imagine a swamp and forest combined, filled with giant plants with scaly bark.² And strange creatures were there too, like dragonflies that were the size of seagulls!³ It was hot and sticky.

Over millions of years, the remains of some of these plants and animals became trapped deep under the earth's surface or inside mountains. The shapes of individual plants and animals from this time can sometimes be found in rocks today, and we call these rare finds "fossils." Fossil fuels are the remains of plants and animals that didn't fully decompose and were covered over time with sediment and turned into either coal, oil, or natural gas under tremendous heat and pressure. To sum it up, coal, oil and natural gas are fossil fuels, the buried remains of plants and animals that lived millions of years ago.

Fossil fuels as energy

Flash back to modern times: humans have dug and drilled and blasted into the earth to bring these fossil fuels to the surface, and now we use those fuels for energy.⁴

Our society today depends on fossil fuels. We use them in the form of gasoline, to make our cars run, or we use them as oil or gas for heating our houses. We also use coal, gas or oil in power plants to make electricity which provides power to lights and dishwashers and anything else you can plug into a socket.

Fossil Fuels Emit Greenhouse Gases

But what do ancient plants and animals have to do with the climate? Well, the answer is that in order to use these fossil fuels for energy, we have to burn them. Burning turns the fuels into gases.

Gases are mostly invisible, so they're easy to ignore, but they're incredibly important. But what is a gas? Think about a campfire: the fire turns the wood (the fuel) into smoke, a gas. It's those gases, particularly ones called "greenhouse gases" that are the REAL problem when it comes to a changing climate. Because there are so many people on earth who burn fossil fuels, the greenhouse gases have increased, changing our atmosphere.

What is the atmosphere?

The atmosphere is like a blanket of gasses surrounding the earth, providing enough air for us to breathe, and keeping the earth warm enough for us to live here. The mixture of gases in the atmosphere has to be exactly right; if it gets out of balance, the earth could become too cold, or too warm. That's what is happening now.

The Greenhouse Effect

With a lot of "greenhouse gases" in the air, the blanket has become too warm. When sunlight comes and hits the earth, the heat gets stuck under this thick atmosphere blanket. So, while the atmosphere naturally makes the earth the right temperature for most living things, adding the gases from the burning of fossil fuels is making it TOO warm.

It's kind of like being in a car on a hot day: if you have the windows open, it gets a little warm, but the heat doesn't build up too much in the car because it can escape through the windows. But if you have the windows closed on a sunny day, the car gets really hot inside, keeping the heat in.

The same thing happens in a greenhouse, which is designed to keep plants nice and

warm: sunlight comes in through the glass roof and heats up the room because the heat can't escape.

So these gases from burning fossil fuels have built up to dangerous levels and are making the earth hotter by acting like a big blanket, or a hot car, or a greenhouse. That's why they're called "greenhouse gases"!

Heating up the planet changes LOTS of things, including the climate. That doesn't mean that every day is hotter than it was the day before. But when you look at the weather across the planet over a year, it's hotter than it was the year before. That impacts nature in a lot of ways, but we'll talk more about that another time.

Deforestation

One last point: remember those plants we were talking about? All plants, and especially trees, actually take greenhouse gases *out* of the air. They take it in through their leaves and use it to grow. This means that trees can help reverse the problem that we're causing. Except... we're also cutting down the trees!

When you cut down a forest, it's called deforestation. In 2017, 39 million acres of forests were cut down.⁵ The Global Forest Watch puts it a different way, saying it's the equivalent of losing 40 football fields of trees every minute for an entire year. And the Amazon Jungle, the world's largest tropical rainforest, has lost nearly one fifth of its forest cover in the last 50 years.

A lot of this deforestation happens because people living in the area want to use the land for farming: to grow the food they need to survive, or to raise cattle or other animals for big companies around the world.⁶ But cutting down these forests is having a big impact on everyone in the world.

Conclusion

From ancient plants, to fuel, to greenhouse gases, to a warmer planet– climate change is complicated. But knowing more about it can help us change our actions, so we can keep our planet safe and healthy for our future.

Review Questions

- 1.
- 2.
- 3.

Suggested Projects

Citations

1. "[What Can Trees Tell Us About Climate Change?](#)" Published on NASA Climate Kids.
2. "[The Carboniferous Period](#)," Published by Fun Kids.
3. "[Carboniferous Period](#)," Published by National Geographic.
4. "[Fossil Fuels: The Dirty Facts](#)," by Melissa Denchak. Published by the NRDC, June 29, 2018.
5. "[2017 Was the Second-Worst Year on Record for Tropical Tree Cover Loss](#)," by Mikaela Weisse and Liz Goldman. Published on Global Forest Watch, June 27, 2018.
6. "[Amazon Deforestation](#)," Published by the Council on Foreign Relations.

- Other resources

"[Tropical Forests and Climate Change: The Latest Science](#)," by Michael Wolosin and Nancy Harris. Published by the World Resources Institute, June 2018.