






PART ONE

Understand the Causes and Effects of Global Warming and Climate Change




Online Chat ○ — ✕




MORITZ


“Hallo! Wie geht’s?
Whoops, let’s try that again in English...
Hello! How’s it going?
It’s such an awesome day here in Munich! I’m just finishing up my homework and enjoying the sun.”



“Hi, I love the outdoors, too! I especially love it on clear days when the air is crisp.
We are studying about the environment in school. But, it looks like our environment is in über trouble! We’re learning what we can do about it.
I hope we can learn a lot from each other and become partners in helping to save the environment.”




ALICIA




MORITZ


“I hope so, too.
Want me to tell you a story?
My grandfather raises bees in the German state of Brandenburg, and he told me a story about how the **ecology** of bees is changing.”




DEFINITION ALERT



ECOLOGY: the interrelationship of organisms and their environments



“Cool! I’d love to hear your story. I’ve heard that the bees all over the world are in trouble!”



ALICIA



It's a small world! And, it's even smaller for a honeybee. Honeybees are hard workers. Their mission is to gather pollen to take back to the hive where it is turned into honey.

On a summer's day, you can watch them go from flower to flower.

But what if you were a honeybee and one day you noticed that there were fewer and fewer bees? Even worse, what if you noticed that some of your friends never returned to the hive and the number of bees in the hive was decreasing? Wouldn't that be a scary feeling?



That's what was happening in Brandenburg, Germany. Beekeepers reported that millions of honeybees were dying for no apparent reason. Something in the environment was killing them. In some cases, two-thirds of their bees had died in just one month.

German scientists were alarmed and began investigating. They wanted to stop the bees from dying before there were no more bees left. They knew that without the honeybee, life on this planet would be very different. Honeybees not only produce honey, but by spreading pollen from one plant to another, they ensure that these plants will continue to thrive. Without the honeybee, our food chain would be dramatically compromised.




The scientists discovered that a pesticide called clothianidin was responsible for the deaths of the honeybees. The Federal Office of Consumer Protection and Food Safety banned the use of the pesticide.

But just like the honeybees, scientists all over the world are warning humans that we are also in danger from substances in our own environment. We need to take action to protect ourselves.




Online Chat



ALICIA

“So, the world could be changing for humans, too!”



DR. BLUME

“Yes, it could be. Many people may not know that scientists are hard at work all over the world trying to find the answers to some very important questions about our own environment.”




BRAINSTORM #1

Understanding the causes and effects of global warming and climate change.


Why are climate change and other environmental concerns worldwide issues?
What evidence is there that our climate is changing?
What are some other consequences of climate change you can think of?

Online Chat



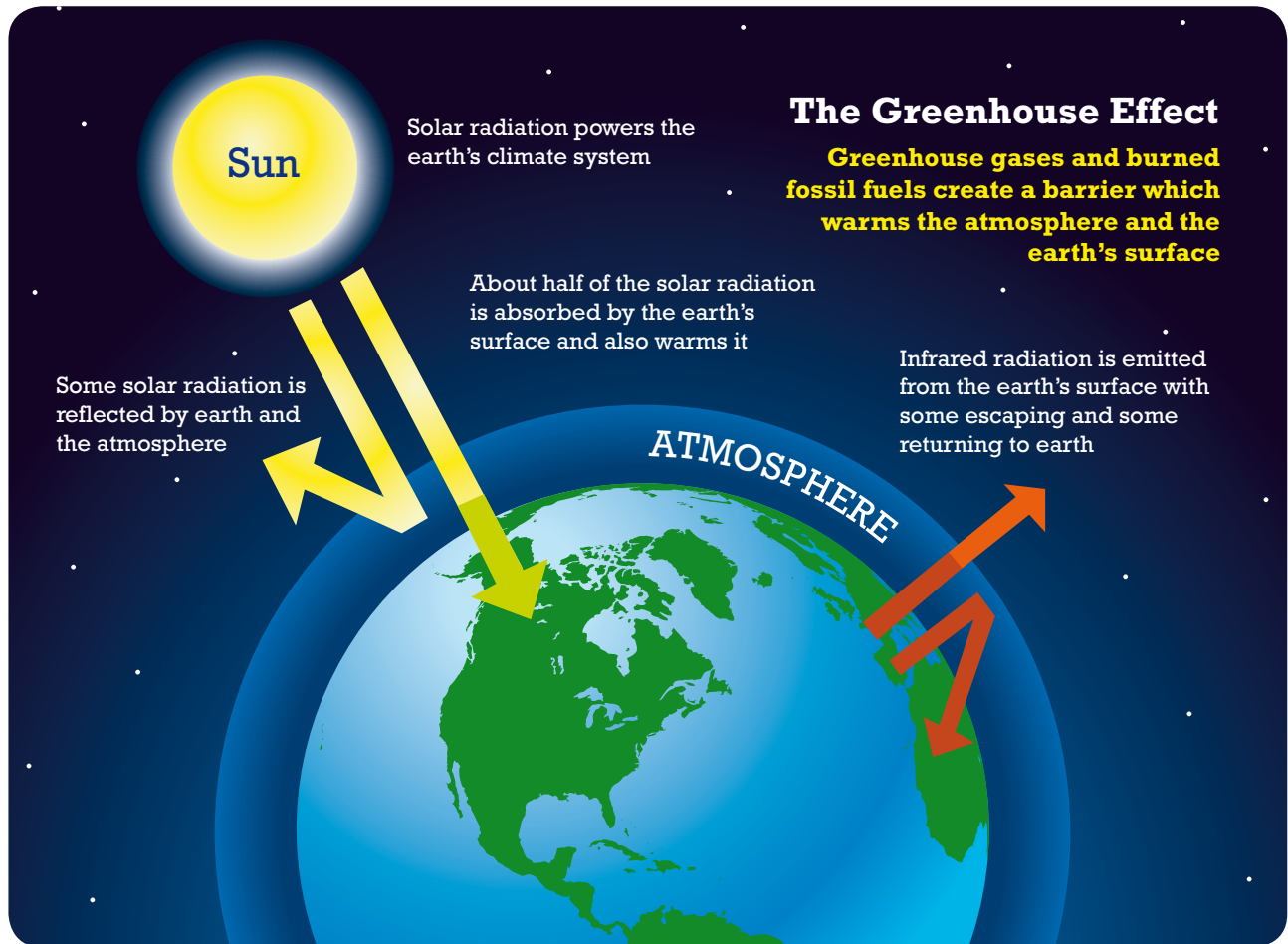
ALICIA

“Wow. Those are some difficult questions!
What is causing these warmer temperatures?”



DR. DAVIS

“Scientists all over the world now believe that global warming is the cause of temperature change.”



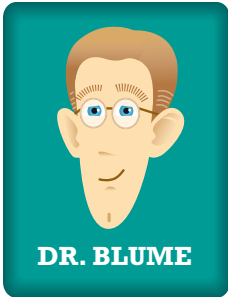
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"Does the **greenhouse effect** we heard about have something to do with global warming?"

DEFINITION ALERT**GREENHOUSE EFFECT**

The change in the temperature of a planet by the presence of an atmosphere containing gas that absorbs and emits infrared radiation.

Online Chat



“Yes, but the ‘greenhouse effect’ is necessary and can be a good thing. We could not live here on Earth without the greenhouse effect. It would be too cold. Our atmosphere acts like a greenhouse and traps these ‘greenhouse gases’ to make our planet warm enough for us to live on.



Our earth is a great place to live because of the greenhouse effect. Plants absorb carbon dioxide (CO₂) when they grow in spring and summer and release it back to the atmosphere when they decay and die in fall and winter.

But having just the right amount of greenhouse gases in our atmosphere, like carbon dioxide, nitrous oxide, and methane, is a delicate balance – too little and we get too cold, too much and we get too warm.”

“And, right now, we are starting to get too much CO₂! Scientists think that since the **Industrial Revolution** we have started to add too many greenhouse gases to the atmosphere and the balance is getting tilted toward heating up the environment.”



RESEARCH EXERCISE: Use the research tools at your disposal to learn about the Industrial Revolution. These tools may include other textbooks, library books, encyclopedias, and Internet-based resources like Google.



Online Chat



ALICIA

"I am sure that too much exhaust from cars doesn't help!"



"Now, let's look at the evidence around us that the environment is changing and what these changes might mean."



DR. DAVIS



DR. BLUME


"Climate change is definitely taking place. The earth is getting warmer and these climate changes are worrisome.

All we have to do is look around us.


More than 100 cold-dependent species are in trouble. Polar bears have started dropping in numbers and weight and emperor penguin populations have shrunk by a factor of 30 in some areas."





“A record amount of Greenland’s ice sheet melted last summer -- 19 billion tons more than the previous high mark. And for the first time on record, the **Northwest Passage** was open to navigation.” 



“Studies show that 2005 was the warmest year since reliable, widespread instrumental measurements became available in the late 1800s, exceeding the previous record set in 1998.” 

Online Chat



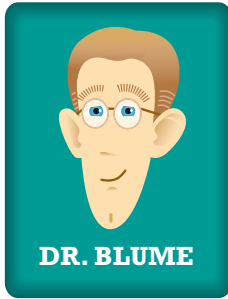
“Some 4 million acres of mature trees in Alaska have been killed by spruce bark beetles. Scientists believe that warmer temperatures have allowed these beetles to breed and mature twice as fast as normal.”




“Bleached coral reefs that protect coastal areas and harbor some of the most colorful life on Earth are dying prematurely because of warming ocean waters and higher levels of carbon dioxide.”



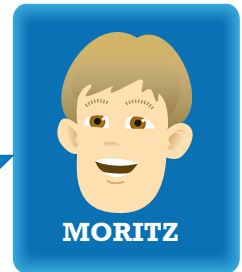
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“Mont-Blanc, Europe’s highest peak, lies in the French Alps. A University of Innsbruck study suggests that due to an average 3 percent decrease in Alpine ice, glaciers in the Alps will melt away by 2050.” 



“It’s not just the French Alps! I’ve seen pictures of the Alps here in Germany, and my parents told me that the snow was much deeper when they were my age! In fact, we have to go higher and higher up the mountains to go sledding every winter. And some of the ski slopes at lower elevations don’t even get snow anymore!”



“Ganz genau...I mean, quite right, Moritz! According to the Center for Climate Systems Research, in most places in the Northern Hemisphere, the weather is getting warmer, and winters are getting shorter and less extreme.

The earth’s average temperature is definitely increasing. This is a real concern to scientists because climate change means changes in rainfall patterns, a rise in sea levels from melting ice, and changes to plants, wildlife and humans.”

ACTIVITY #1: Using an external resource like the CIA World Fact Book, complete the information about each country on the following chart:

Sweden	Mexico	China	USA	Germany	Japan	
						Percentage of total surface area on Earth
						Percentage of world population
						Economic strength (per capita GDP)
						CO ₂ Emissions (total)
						CO ₂ Emissions (per capita)

What conclusions can you draw from the information in the above table?