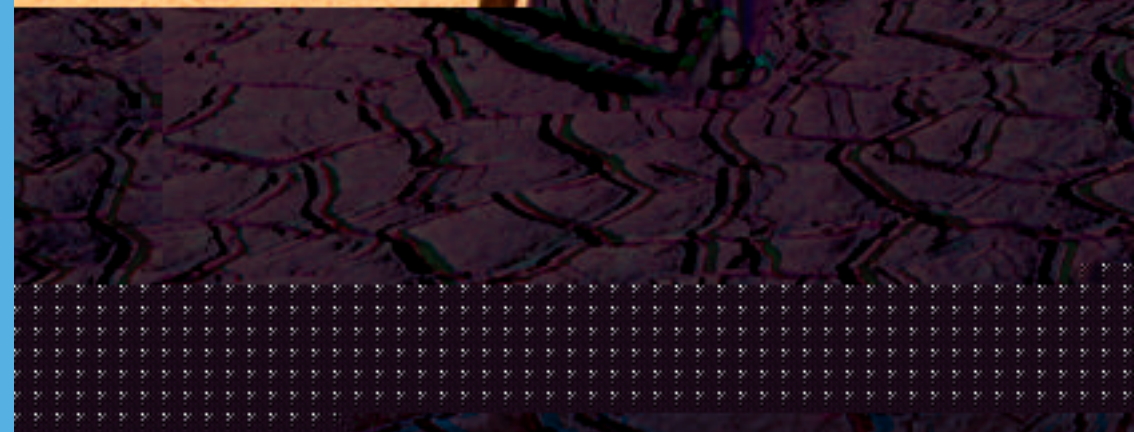


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Science

Science

Earth Science



# Danger: The World Is Getting Hot!

by Johanna Biviano

Genre	Comprehension Skills and Strategy	Text Features
Expository nonfiction	<ul style="list-style-type: none"><li>• Main Idea and Details</li><li>• Fact and Opinion</li><li>• Text Structure</li></ul>	<ul style="list-style-type: none"><li>• Chart</li><li>• Diagrams</li><li>• Graph</li><li>• Time Line</li></ul>

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# **Danger: The World Is Getting Hot!**



**by Johanna Biviano**



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### What's the Weather Like Today?

What do you say when people ask you what the weather is like? If it's summertime, you might say, "It's sweltering." You might have snow where you are or torrential rains. The weather changes day to day, but most areas have pretty much the same kind of weather from season to season every year. That is called the climate.

Have you ever been asked, "What is the climate like today?" You probably have not. The climate doesn't change from day to day.

Many scientists, however, ask, "What will the climate be like in five years? How about in one hundred years?" They worry that the Earth's climate is changing, and that this may be harmful.



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# The Greenhouse Effect



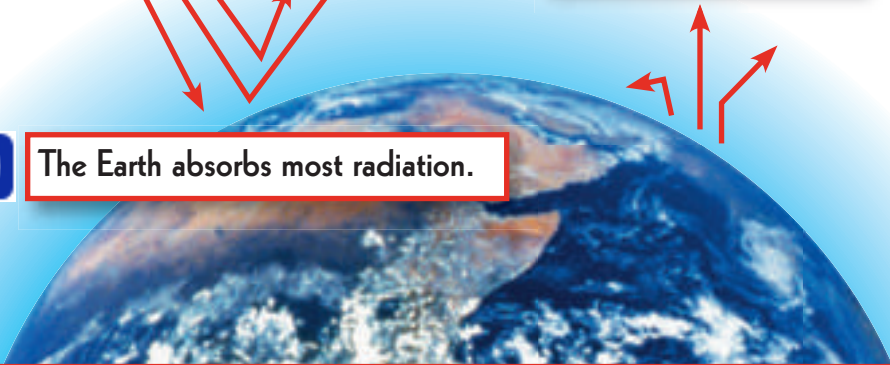
Solar radiation is reflected by Earth and the atmosphere.



Some reflected radiation is captured by greenhouse gases and sent back to warm Earth's climate.



The Earth absorbs most radiation.



Because of greenhouse gases, more of the sun's warmth stays trapped on the Earth. This makes it hotter.



## The Earth's Climate

Of all the planets in our solar system, Earth has the most hospitable climate for human life. Earth's climate has changed dramatically over time, but these natural changes came gradually. Scientists worry today because the climate seems to have changed so quickly in the last hundred years.

The Environmental Protection Agency (EPA) reports that the Earth's overall temperature has risen one full degree Fahrenheit in the last hundred years. That may not seem like a lot, but it really is something to be concerned about.



## The Temperature is Rising!

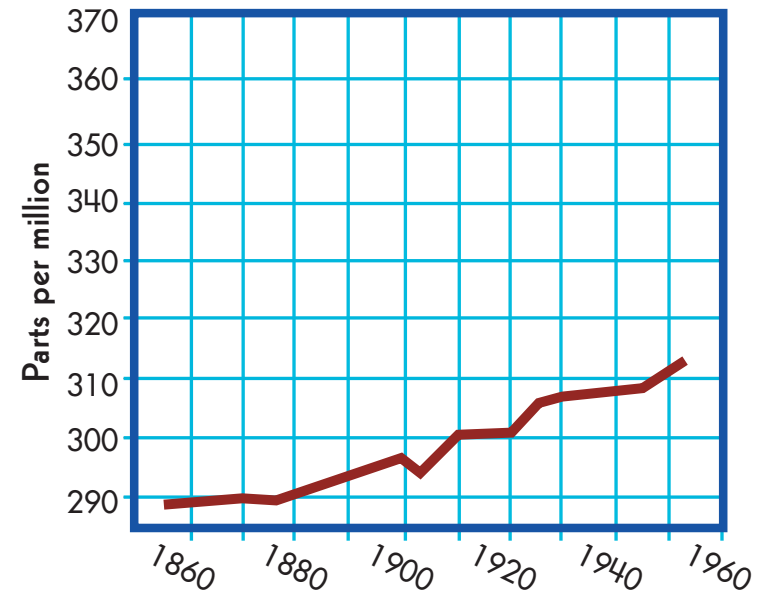
There is scientific evidence that humans are at least partly responsible for this temperature change.

The atmosphere is the air around the planet. Earth's atmosphere contains gases such as carbon dioxide, methane, nitrous oxide, water vapor, and ozone. These are called greenhouse gases because they act like the glass of a greenhouse, trapping the sun's rays in the atmosphere. If there were no greenhouse gases, the sun's heat would bounce back into space, and the planet would be too cold for us!

Since the early 1800s, factories burning wood, coal, and oil have poured pollutants into the air. The carbon dioxide in the air rose 30%.

## Carbon Dioxide Concentrations

Ice Core Data



Since the 1800s, there is 30% more carbon dioxide in the air.





### How We Add to the Greenhouse Effect

Cars, planes, and power plants all create greenhouse gases. In the last century, these gases have increased in the atmosphere at an alarming rate.

Whenever we burn wood, oil, gasoline, natural gas, or coal, we release carbon dioxide.

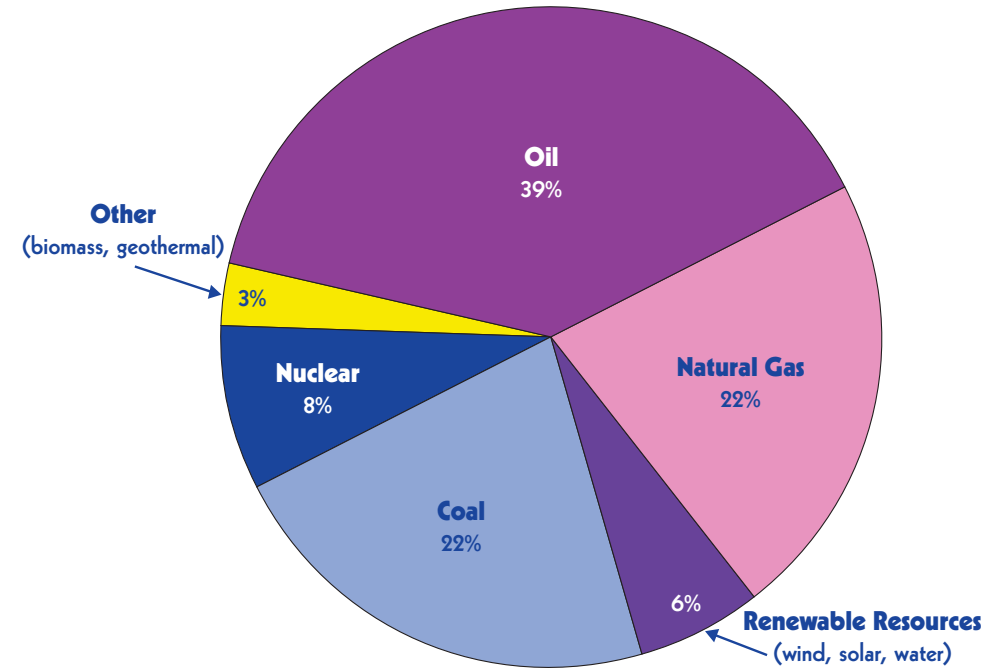
Methane is another greenhouse gas. Landfills are one source of methane. Methane absorbs 20 times the amount of heat that carbon dioxide absorbs. Also, when we burn fossil fuels, nitrous oxide enters the air. Nitrous oxide absorbs 270 times the amount of heat that carbon dioxide absorbs.



Cars, planes, and power plants all create greenhouse gases.



### U.S. Energy Consumption, 2003



Source: Energy Information Administration

### Non-Natural Gases

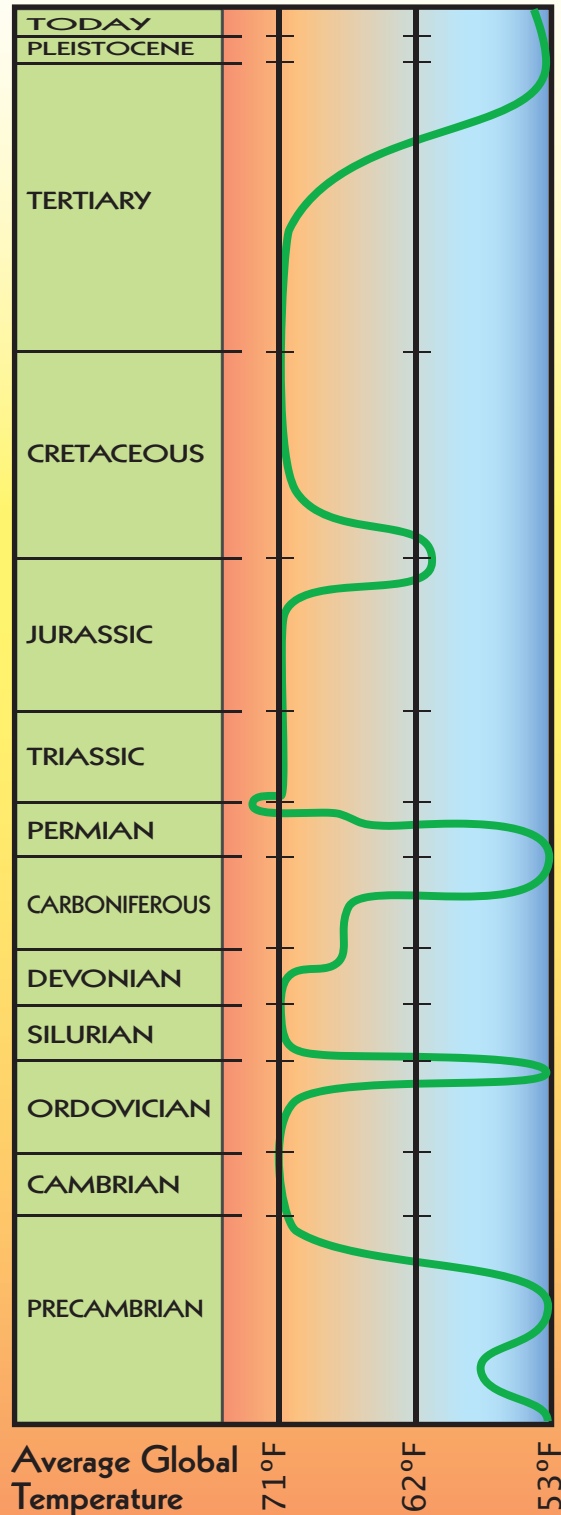
Carbon dioxide, methane, and nitrous oxide all occur naturally. But because we have so much industry, we produce three more kinds of these dangerous gases. These gases are called hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). These gases trap up to 11,000 times more heat than carbon dioxide!

There are also fluorocarbon gases that are used as propellants inside spray cans called aerosols. Many nations around the world have passed laws to make sure that we produce fewer aerosols.





Global Warming  
from the Dinosaur  
Age to our time.



### Is Global Warming a Fact?

Some scientists venture the opinion that humans are not necessarily the primary cause of global warming. They believe there may be other reasons our planet has grown warmer.

They believe that what we call global warming is just a natural part of our planet's climate cycle. Since the beginning of life on Earth, the climate has changed from hot to cool and back again. At the coldest point in time, the Ice Age, much of the Northern Hemisphere was covered in glaciers. At the warmest times, there were no ice caps at the North or South Poles. Could we be headed toward another warm era in this pattern? It's impossible to tell for certain, as these patterns take hundreds of years to unfold.





🔊 If global warming continues, the Earth will get hotter and hotter.



### What Do We Know for Sure?

Global warming is a fact. Although we can't be certain about its effects, we can try to predict what is likely to happen. And from these predictions, we can take actions to help keep our Earth a safe place to live.

Scientists do know for sure that we are producing many greenhouse gases. This makes it highly likely that humans are contributing to global warming. Some scientists predict that global warming will make Earth's weather more **forbidding** and more destructive in the future.

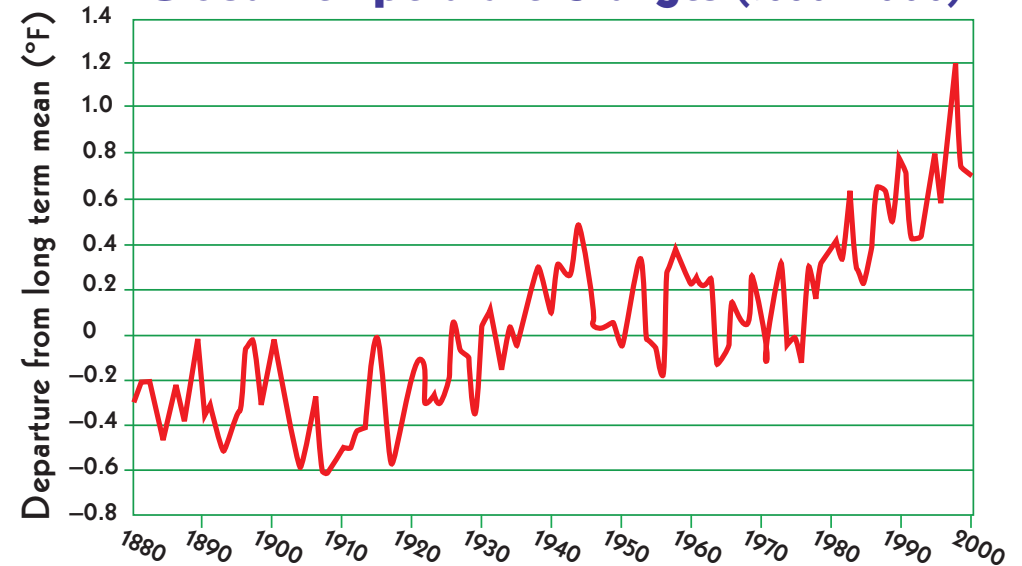


### Predictions About Our Weather

Although they cannot predict specific outcomes, scientists have made some predictions about what might happen to our weather if we continue to pump more greenhouse gases into the atmosphere.

Meteorologists are people who study weather. Along with other scientists, they worry about the harmful effects of global warming. As a demonstration, think about hurricanes, tornadoes, and other severe weather events and consider the damage they cause.

### Global Temperature Changes (1880–2000)



Source: US National climate data center, 2001



Temperatures have risen steadily throughout the 20th century.





### How Will Global Warming Affect Our Weather?

Every year, hurricanes tear along the coast of the southern states and the Caribbean islands, damaging houses and harming—even killing—people. These terrible storms occur in the tropics because of the weather conditions there: they feed off warm air and water.



Global warming could produce terrible hurricanes.



Meteorologists fear that warmer global temperatures will allow storms to travel to places where they have never been before. They also fear that the storms could become even more **formidable** than any we have ever seen. These storms could reach cities in inland areas that aren't equipped to deal with them.

### How Will Global Warming Affect the Environment?

As the planet warms, our environment will change. What might these changes be like?

The ice and snow at the North and South Poles could melt. This would raise sea levels all over the planet. Over the last century, the planet's sea level has risen 4–8 inches. This floods beaches and wetlands and adds higher **salinity** to bays and rivers. Coasts become more vulnerable to storms.

When **icebergs** melt, they leave many animals homeless. The National Aeronautics and Space Administration (NASA) studied the ice cover in Greenland over a six-year period and concluded that Greenland's ice cover is thinning rapidly. Although it is harder to measure the change in a huge **continent** like Antarctica, the melting in Greenland is an ominous sign.







## How Will Global Warming Affect Our Health?

A warmer planet could be dangerous to the health of humans. Diseases spread by hot weather insects, such as mosquitoes, will become harder to control and spread to more areas.

People with asthma suffer from the heat. As we add greenhouse gases to the atmosphere, the lower atmosphere grows thicker and collects more pollutants.

Global warming is a global problem. Several nations created the Intergovernmental Panel on Climate Change (IPCC) in 1988. This panel studies our global climate all over the world. In 1997, more than 160 nations signed an agreement called the Kyoto Protocol, agreeing to reduce their greenhouse gas emissions. The United States is not one of these nations.

## Is Help on the Way?

In the United States, the EPA helps collect information about global warming and also tries to educate people about its effects.

Along with the IPCC, the EPA encourages industries to lower their emissions. It also wants industry to try to use technology, products, and practices that are better for the environment.

Industry is listening! In the United States, more than two dozen states have made an Environmental Protection Plan.



## New Laws for a Cleaner Environment

The government has passed special laws for industries, limiting the amount of greenhouse gas emissions. Factories and power plants must meet these restrictions.

Meanwhile, scientists and engineers keep trying out new ideas to protect the planet. In **anticipation** of low-emissions laws, car manufacturers have created low-emissions and fuel-efficient models. The government supports Energy Star products, from long-lasting light bulbs to more energy-efficient washing machines.

Recycling helps cut back on greenhouse gases. Americans can also help by keeping their cars tuned up, so they don't waste fuel. It helps to use public transportation and to turn off lights when you leave a room.



Pollution from factories adds to global warming. Many factories have agreed to try to limit the amount they create.





## Poorer Nations

The poorer nations of the world would have a hard time coping with global warming. Many of these nations depend on agriculture to survive, so if storms or weather changes ruin their crops, many people will go hungry.

With fewer medical resources in developing nations, diseases could spread. Also, these nations are less likely to impose laws on their own industries to curb pollution. Why? Because they can't afford expensive new low-pollution factory equipment.



Recycling helps the environment.



## How You Can Help

You can help by recycling. At home, you can start by watching how much electricity you use. Turn off the stereo, the television, and the computer when you are done using them.

You can also help by talking to your family and friends about conserving energy by carpooling, keeping cars tuned up and in good condition, and using buses and subways instead of driving.

The next time your family buys a light bulb, a toaster, a computer, or a car, do some research first! There are lots of energy-saving and low-emissions products on the market now.





## Now Try This

### Trading Bad Habits for Good

In the battle against global warming, every person can help. You can help by watching how you use energy. The less energy you use, the less greenhouse gases are added to the atmosphere. You can start right away!

Old Way



New Way



### Here's How to Do It!

1. Make a list of things you normally do and want to change for the better. Write a list and label it Old Way. Try to go through your day in your mind and list the things you do that use electricity or fuel power.
2. Make another column labeled New Way with ideas for the new way you want to do things. For example, you may have, "Mom drives me to school in the car," in your Old Way column. In the New Way column, you may write, "Take the bus instead." Make sure to leave room for a third column.
3. Place your list where you can see it often. Read it over, add new ideas to it, and try to keep your New Way ideas in your mind.
4. At the end of each day, keep a tally in the third column of how many times you actually did something from your New Way column. Each time you take the bus or walk instead of getting in the car, make a mark. By the end of a week, you will be able to show the changes you have made to help the environment.
5. Share your list with your friends and family to inspire them to make changes too!





# Glossary

**anticipation** *n.* the act of preparing for something before it happens

**continent** *n.* one of seven bodies of continuous land on the Earth's surface: Europe, Asia, Africa, North America, South America, Australia, and Antarctica

**forbidding** *adj.* uninviting or repellant

**formidable** *adj.* giving cause for fear; dangerous; difficult to overcome

**hospitable** *adj.* welcoming and homey

**icebergs** *n.* detached pieces of glacier floating at sea

**salinity** *n.* saltiness



# Reader Response

1. Think about the book you just read. What are the main ideas of the book? Also give some supporting details from the book to expand on your answer.
2. Does the author present both sides of the issue? Find places where the author mentions doubts about global warming.
3. Many of the words used in this book are made up of many parts, especially the scientific words. Some of these parts come from Greek or Latin words. Find words in the text that may have these Greek and Latin words in them:

Word	Meaning
<i>aer</i>	air
<i>geo</i>	earth
<i>di</i>	two
<i>inter</i>	between, over, past, or through

How does the Latin or Greek root help you to understand the meanings of the words you found?

4. Many different types of scientists research the problem of global warming. Look through the text and find information that may have come from:
  - a. Meteorologists
  - b. Paleontologists
  - c. Zoologists
  - d. Chemists
  - e. Geologists

(Use a dictionary if you are not sure what these people do.)

