



## CLIMATE CHANGE

Climate change is related to long-term trends. Scientists can analyze decades or centuries of data to see how and at what rate conditions are changing. Depending on where you are on Earth, you might experience different effects of these shifts in global systems. Some major effects of climate change are sea level rise, increased air pollution, and more frequent and extreme weather events than humans are used to, such as heat waves, droughts, heavy rainfall events, flooding, massive snowstorms, and more intense storms with high winds, hail, and tornadoes.

### **What is weather?**

“Weather” is a short-term state of the atmosphere occurring at a particular time and place. People describe weather in terms of temperature, precipitation, humidity, cloudiness, and wind. Rain, snow, hurricanes, and tornadoes are examples of weather events.

### **What is climate?**

“Climate” is a description of the long-term pattern of weather conditions at a location, usually occurring over a period of 30 years or longer. Delaware has hotter and more humid conditions in the summer and cooler temperatures with chances of snow in the winter, for example.

Climate tells you if you need to own an umbrella where you live. Weather tells you if you need to bring an umbrella with you today.

### **What is climate change?**

Climate change is a significant transformation in average environmental conditions that occurs over years, decades, centuries, or longer. Natural and human activities that change the types and amounts of particles and gases in the atmosphere cause climate change. An example of a natural activity is when volcanic eruptions increase sulfur dioxide (SO<sub>2</sub>) in the atmosphere. An example of a human activity is cutting down forests, which releases carbon dioxide (CO<sub>2</sub>) into the atmosphere.

### **What are greenhouse gases?**

Greenhouse gases are gases in the atmosphere that trap heat (specifically, infrared radiation) close to a planet. The concentrations of greenhouse gases in our atmosphere have changed over time due to natural and human activities. Greenhouse gases include carbon dioxide, water vapor (water in gas form), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and others.



# Frequently Asked Questions

The sun constantly sends energy towards Earth, called electromagnetic radiation. Some of this energy is reflected into space before it reaches Earth, and some is absorbed by the planet. Greenhouse gases absorb heat that bounces off Earth's surface and reflect some energy back towards Earth, making surface temperatures warmer than they would be if our only source of heat was the energy from the sun.

## **What are temperature and precipitation extremes?**

Extremes are conditions or values outside of what is typically expected. Climate change is predicted to increase the frequency and severity of extremes. Temperature extremes are when it is unusually hot, such as in heat waves; or unusually cold, like in bitter cold snaps.

Precipitation extremes occur when there is excess rain, snow, hail, sleet, or ice, which can cause flooding; or when there are prolonged dry periods, causing droughts.

## **How do temperature extremes impact health?**

Temperature extremes do not impact all populations equally. Where you are located determines how frequently and at what level you are exposed to conditions outside of the expected range. All temperature extremes can negatively affect the body's ability to regulate its internal temperature, so an individual's baseline health and their access to resources that help people adapt to changes in the environment (such as shelter, warm clothing, and air conditioning) are major factors in determining how vulnerable people are to consequences of these extremes. Children, pregnant women, older adults, and people with certain health conditions have more difficulty keeping their bodies at a stable temperature than the rest of the public. People experiencing poverty and homelessness have fewer resources assisting them in regulating their body temperature, which makes them more likely to be affected by temperature extremes.

Extreme cold weather is a dangerous situation that can bring on health emergencies. Sometimes cold extremes occur with high wind speeds, which compound the effects of cold stress by blowing heat away from the body. Extreme cold can cause cardiovascular stresses as the body struggles to retain heat and it can cause hypothermia and frostbite.

Extreme heat events can cause heat cramps, heat exhaustion, heatstroke, and abnormally high body temperature, which may lead to hospitalization or death. When it is too hot outside, individuals with chronic conditions such as cardiovascular disease, respiratory disease, cerebrovascular disease, and diabetes are at risk for complications. Beyond their high population densities, urban areas feature many synthetic materials that absorb heat. These "heat islands" are generally hotter than surrounding areas.

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# Frequently Asked Questions

Humans can balance the effects of these extremes by building resources in their environments. Green spaces and new technologies can offer benefits in urban settings. Increased access to air conditioning or cooling centers, or access to central heating, can safeguard communities from temperature extremes.

## **How do precipitation extremes impact health?**

Precipitation extremes can cause flooding, storm surges, drought, and infrastructure issues such as closed roads and power outages. Flood events can contaminate water with harmful microbes that cause foodborne and waterborne illnesses. Indoor spaces that have been exposed to excess water have an increased risk of mold growth and poor indoor air quality. Exposure to mold spores can cause headaches, worsen respiratory conditions, cause eye, nose, and throat irritation, and cause infection in people with weak immune systems.

Research has shown that preparation, adaptation, and mitigation actions can help reduce the negative effects of precipitation extremes. Conserving water resources during drought, weatherproofing energy grids, and building walls to hold back flood waters are all strategies communities can use to combat precipitation extremes.

## **Resources**

<https://mynasadata.larc.nasa.gov/basic-page/about-earth-system-background-information>

<https://www.climate.gov/maps-data/climate-data-primer/whats-difference-between-climate-and-weather>

<https://www.ncei.noaa.gov/news/what-are-proxy-data#:~:text=These%20proxy%20data%20are%20preserved,lake%20sediments%2C%20and%20historical%20data.>

<https://www.epa.gov/climatechange-science/frequently-asked-questions-about-climate-change#climate-change>

[https://www.niehs.nih.gov/research/programs/climatechange/health\\_impacts/heat/index.cfm](https://www.niehs.nih.gov/research/programs/climatechange/health_impacts/heat/index.cfm)

[https://www.niehs.nih.gov/research/programs/climatechange/health\\_impacts/weather\\_related\\_morbidity/index.cfm](https://www.niehs.nih.gov/research/programs/climatechange/health_impacts/weather_related_morbidity/index.cfm)

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