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Natural Disasters: Weather and Climate



What is a natural disaster?

What do hurricanes, wildfires, blizzards, and drought have in common? They are **natural disasters**¹. Natural disasters are events caused by natural processes that lead to serious damage and death. There are five types: meteorological, climatological, geological/geophysical, hydrological, and extraterrestrial. We will talk about meteorological and climatological natural disasters.

Did You Know?

Lightning can heat air up to 50,000°F (27,760°C), three times hotter than the surface of the Sun!

Kinds of natural disasters

Meteorological²

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Climatological³, on the other hand, has to do with the climate. **Climate**⁴ is the state of weather over long periods of time. Climate-related disasters include droughts, extreme heat, and wildfires.

Weather natural disasters

There are two general kinds of weather: normal and severe. Normal weather is just everyday conditions. This means winds and breezes, sunshine or clouds, rainstorms or snow. Severe

¹ **Natural disasters:** events caused by natural processes that cause serious damage and death.

² **Meteorological:** has to do with weather.

³ **Climatological:** has to do with climate.

⁴ **Climate:** state of weather over long periods of time.

weather is rarer and can be dangerous to life and property. Examples are extreme thunderstorms, tornadoes, and hurricanes.

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Lightning is caused by charge differences.

Lightning⁵ also forms in cumulonimbus clouds. This happens when liquid and frozen water bump into each other as liquid droplets rise, and the heavier ice crystals fall. The ice pulls electrons, which are negatively charged, off the water. This leads to a charge difference between the top and bottom of the cloud. The falling ice has a negative charge and the rising water has a positive charge. The electrical charges need to be released, like when you shuffle across a carpet and touch a metal doorknob. But instead of a small shock, the charge is released as lightning. Thunder always follows lightning. Lightning heats up the air around it. This heat causes the tube of air around a bolt of lightning to quickly grow and shrink, causing vibration. The vibration makes the loud thunderclap sound. These vibrations continue, getting smaller and smaller, causing a low rumbling sound.

Thunderstorms are dangerous for planes, but also cause heavy winds, driving rain, and sometimes even hail. Being struck by lightning is rare, but the effects can be severe. Between 2003 and 2012, an average of 35 people per year were killed by lightning in the United States. Thunderstorms can last for hours and spread over 10 km wide. They can cause other disasters like flooding or hailstorms.

Thunderstorms can produce **tornadoes**⁶. Tornadoes are spinning funnels of air. They have wind speeds of 250 miles (400 kilometers) an hour or more. Less than one percent of thunderstorms have tornadoes. They form when warm air traveling up is trapped under



Thunderstorms can produce tornadoes.

⁵ **Lightning:** bolt of electricity caused by charge differences in cumulonimbus clouds.

⁶ **Tornadoes:** spinning funnels of air.

a layer of cold air. The warm air has nowhere to go; it can't sink because it is less dense than the air below it. But the air molecules keep moving, swirling around and around each other until a tornado forms.

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Hurricanes⁷, also called typhoons or cyclones, are another type of severe weather. They are storms that form in tropical seas and pull in winds. These winds form a tube shape. Hurricanes move out of tropical seas and keep picking up winds. They can be about 600 km (375 mi) wide. They have wind speeds of 119 km (74 mi) per hour or more. Below this speed, they are **tropical storms**⁸. There are five categories of hurricane. Category 1 storms have speeds between 74 and 95 miles per hour, while the winds of Category 5 storms reach 157 miles per hour and above. Hurricanes can cause flooding. Floods damage buildings, harm soil, and contaminate water. One of the most dangerous effects of hurricanes is **storm surge**⁹: fast and unusual sea level rise. Hurricane winds force ocean water onto land as a large wave that can be 20 feet high and travel several miles. Storm surge can knock over buildings and flood soil and freshwater bodies with salt water. Hurricane winds can cause severe damage on their own, destroying buildings and whipping dangerous debris through the air. In addition, tornadoes can form in hurricanes.



Hurricanes are dangerous low-pressure storm systems.



Hurricane winds can be devastating.

⁷ **Hurricanes:** storms with wind speeds of 74 mph or more.

⁸ **Tropical storms:** storms with wind speeds below 74 mph.

⁹ **Storm surge:** fast and unusual sea level rise.

Winter weather can also be severe, bringing snow, ice, and hail storms. Snow forms when tiny ice crystals in clouds combine. As more ice crystals come together, they become flakes, which get heavier. They become so heavy that they fall out of the clouds. Snow falls at temperatures below 2°C (35.6°F). **Blizzards**¹⁰ are intense snowstorms with strong winds. Snow can make driving dangerous and damage trees and buildings. Winds can reach hurricane speeds. The cold itself is dangerous, causing hypothermia and frostbite in humans and other animals. If the temperature rises too quickly after a blizzard, flooding is possible.



Snow accumulation from blizzards can be extreme.

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Hail¹¹ comes from thunderstorms and can fall in seasons other than winter. Rising air carries raindrops up into very cold parts of the atmosphere. Up there, they freeze into hail, or balls of ice. As more and more raindrops are pushed up into these cold areas, hail grows. The stronger the rising air (called an **updraft**¹²), the longer hailstones stay up high, and the bigger they can grow. When hail becomes too heavy for the updraft to hold, or if the updraft weakens,



Hailstones are balls of ice.



Hail damages vehicles.

they fall. Hailstones can grow from about ¼ inch in diameter to above 4 inches. The largest hailstone measured in the United States was 8 inches in diameter. By itself, hail can harm homes, vehicles, and people. With strong winds, much more damage can be done. Although it is rare for people to be killed by hail, it has happened, and it is more likely if there is high wind.

¹⁰ **Blizzards:** intense snowstorms with strong winds.

¹¹ **Hail:** balls of ice.

¹² **Updraft:** rising air.

Climate natural disasters

Climate includes the long-term averages or extremes of weather. Climatological natural disasters are caused by climatic changes or long-term weather. These include such dangers as drought, extreme heat, and wildfires.

Drought¹³ is a long period of low rainfall. This can lead to slower flow in rivers and streams, low water levels in lakes and ponds, and less water available for animals (including humans) and plants (including crops). Long and severe droughts can lead to wildfires. Low snowfall can add to droughts because many areas rely on snowmelt as part of their water supply. If snowfall is low, the snowmelt will be as well.



Drought is a long period of low rainfall.

Extreme heat¹⁴

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Wildfires¹⁵ are out of control fires that happen in natural areas, like fields or forests. Drought and high temperatures make wildfires more likely. They can be sparked by anything from lightning to humans. Wildfires are dangerous to homes, businesses, people, and animals. They can spread for miles. In addition to the danger of burning, the smoke from wildfires pollutes the air, which can harm eyes and lungs and is very dangerous for people with asthma. Natural wildfires are an important part of the cycle of some environments, but fire damage can weaken the soil, making flooding and landslides more likely.



Wildfires can be very destructive.

Summary

We have covered a wide range of natural disasters, caused by both weather and climate. Each brings its own brand of devastation. Some come with early warning systems, such as tornadoes. Others, like wildfires, do not. Many will get worse with global climate change. Each shows the power of our planet.

¹³ **Drought:** long period of low rainfall.

¹⁴ **Extreme heat:** long-term high summer heat and/or humidity.

¹⁵ **Wildfires:** out of control fires in natural areas.

Reading Comprehension Questions

1. What are
2. What are
3. Name two of each, meteorological and climatological, natural disasters.
4. What
5. At what temperatures does snow fall?
6. Even
7. How
8. Aside from the fire itself, what is another danger of wildfires?

Extension Questions

9. Which
10. Which of
11. Create an infographic about one category of natural disaster, including where it is most likely to occur. Give examples of past events. Are these disasters likely to intensify with global climate change? Check out [canva.com](https://www.canva.com) for templates.

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