



## Lightning Strikes



Lightning strikes the earth as often as 2,000 times an hour in the United States. Every year an average of 80 Americans are killed by lightning. Most deaths occur in the late summer, a time when thunderclouds boil over the horizon and when many people vacation out-of-doors.

**Building Up a Charge** On a hot summer day, heat rises from the ground and travels upward into the clear sky. As the air rises, it cools. Moisture in the air condenses, forming the ice crystals and water droplets that give shape to towering cumulonimbus clouds. These condensation particles cool and fall through the rising warmer air; they then warm and rise again as other particles fall, creating turbulent currents with speeds of up to 100 miles per hour. As the particles rush through the air, they lose or gain electrons, becoming positively or negatively charged. For reasons not clearly understood, the positively charged particles gather at the top of the cloud, while the negatively charged particles gather at the bottom.

As the cloud moves over the earth, its negatively charged underside induces a positive charge in the ground. It is this charge you experience when your hair stands on end; you may also hear humming or sizzling, or experience a tingling sensation. Tall objects may glow with a blue light known as St. Elmo's Fire. These are all signs that a lightning strike is imminent.

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**The Thunder Rolls....** A lightning bolt heats the air within its channel to temperatures in excess of 50,000 °F. The air explodes, creating a supersonic shock wave. As the wave slows to the speed of sound, you hear thunder. Because sound travels at a rate of roughly 1,000 feet per second, you can determine your distance from the strike by counting the seconds between the lightning flash and when you hear thunder. Dividing by 5 gives the distance in miles. Although this *may* help you determine your margin of safety, it can be difficult to be sure that the thunder you hear originates from the lightning you saw. Remember too that while the sky may be blue directly above you, lightning can strike several miles from its source cloud. **Whenever you hear thunder, you are close enough to be hit by lightning.** Lightning danger persists as long as 30 minutes after you hear the last thunderclap.

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## The Impact

When lightning strikes a tree, the sap flashes into steam and the tree explodes. When lightning strikes a human being, the effects are less dramatic, but still potentially fatal. Victims of lightning strikes are almost always knocked unconscious; intense muscle contractions often throw them to the ground, causing broken bones or other injuries. Burns may be internal or external, light or severe. Most lightning deaths occur because the lightning interrupts the electrical impulse that regulates the heartbeat. The result is cardiac arrest.

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## Avoiding the First Strike

Lightning has been known to strike the same place, and even the same person, more than once. Your best option is to avoid the first strike.

### Outdoors

- ⚡ **Avoid exposed areas like mountaintops and scenic overlooks such as Point Supreme where you are the tallest object.**
- ⚡ Get out of and away from open water.
- ⚡ Put down umbrellas, golf clubs, and other objects that may act as lightning rods.
- ⚡ **If at all possible**, take shelter in an enclosed building or in an all-metal vehicle with the windows rolled up. Avoid contact with metal components of the vehicle. Convertibles, small sheds in open areas, and open-sided picnic shelters will not protect you from lightning.
- ⚡ **If you cannot reach a car or building**, stay away from metal conductors such as fence lines, metal pipes, and rails which may carry lightning from a distance.
- ⚡ Do not stand beneath natural lightning rods such as tall trees. In a forest, seek shelter in groves of shorter trees or in low-lying areas.
- ⚡ Move to a low place, such as a valley, but be alert for the possibility of flooding.
- ⚡ Caves and crevices may not be safe shelters—moisture in their walls and floors can conduct electricity.
- ⚡ **If no shelter is available**, do not lie flat on the ground. Crouch with your feet together and your hands over your ears to minimize hearing damage from thunderclaps. Stay at least 15 feet away from other people so that lightning does not jump between you.

### Indoors

- ⚡ During electrical storms, avoid contact with electrical wiring, plumbing, or telephone lines, which may act as conduits for lightning striking the house. This is not a good time to take a bath or a shower.
- ⚡ Stay away from windows. They may shatter if hit by lightning.

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## First Aid

Victims of lightning strikes do not carry an electric charge and should be assisted immediately. If the victim is not breathing, provide mouth-to-mouth resuscitation; if their heart has stopped beating, administer CPR. For other victims, check for and treat burns, and monitor for shock. All victims of lightning strike require advanced medical attention.