

MAS NOTE

From the University of Delaware Sea Grant Marine Advisory Service
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BEACH SAFETY: PROTECT YOURSELF FROM LIGHTNING

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You're lying on the beach. It's a hot and hazy summer day—perfect for your vacation at the shore. Then suddenly you hear thunder in the distance. Get moving! The lightning that caused that thunder can *kill*.

In the United States, lightning kills, over time, more people than do hurricanes, floods, or tornadoes. Although lightning rarely reaches the catastrophic dimensions that make headlines, it consistently kills over 100 people a year in this country. To prevent a future tragedy from happening, you should fully understand the threat of this natural phenomenon and how to protect yourself from it.

What Is Lightning?

Lightning is simply nature's way of equalizing contrasting charges that build up when cool and warm air masses collide. Within thunderstorm clouds, water droplets race past each other in up- or downdrafts. This friction causes a build-up of electrical charges—positive charges at the top; negative charges near the bottom. When these charges become strong enough, lightning occurs and neutralizes them. The heat generated by this giant spark rapidly expands the air, and thunder sounds.

Lightning may strike within a cloud, between clouds, or between a cloud and the ground. The last case happens when the bottom of a cloud becomes so highly charged that an opposite charge is induced on the ground. Bolts of lightning follow the path of least resistance to electrical neutrality—they'll strike either the closest or the strongest center of opposite charge. The trick in avoiding lightning is not to be either.

Where Does Lightning Strike?

One study of lightning strikes indicates that a significant number of victims died or were injured while on or near open water. Water and lightning are a natural combination. It is apparent that lightning in marine areas (while boating, fishing, or visiting beachfronts or piers) is particularly dangerous.

Lightning will strike high objects. A person standing on the beach is the shortest path from the sky to the ground. Because of this characteristic of lightning, surf fishing and other beach-related activities are exceptionally dangerous during a thunderstorm.

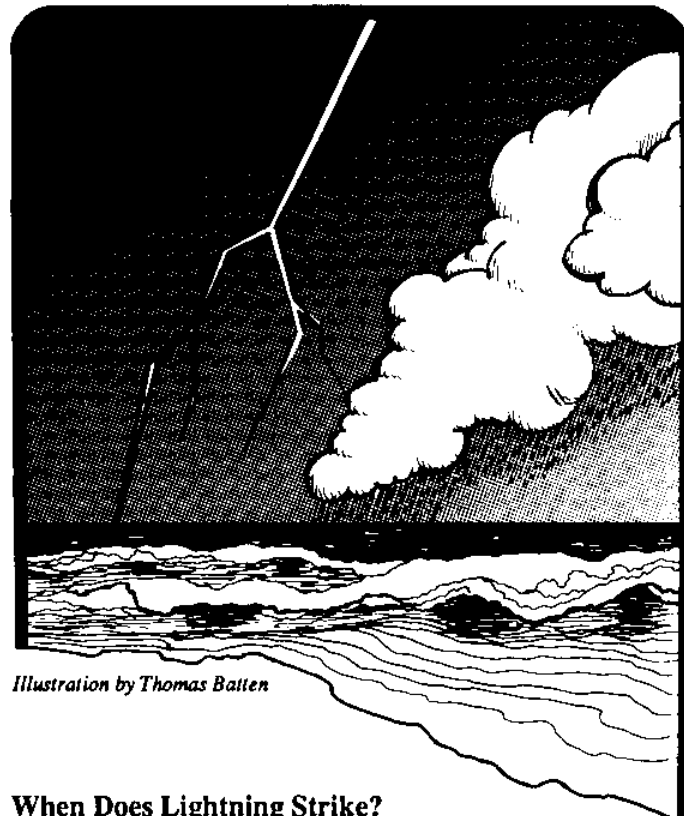


Illustration by Thomas Ballen

When Does Lightning Strike?

In many instances of lightning casualties, no rain was falling at the time of the lightning strike. Frequently, strikes occurred just prior to the onset of a thunderstorm.

Most lightning strikes occur in the afternoon—70% of them between noon and 6 p.m. As the air temperature warms, evaporation increases. This warm, moisture-laden air rises and evaporates, forming fluffy cumulus clouds. As more moisture accumulates, the clouds darken and change into cumulonimbus clouds—thunderstorm clouds. These clouds frequently have a flattened top or anvil shape, reaching to 40,000 feet or more.

How Do I Know If a Storm Is Approaching?

A thunderstorm's electrical activity can tell you something about the storm's distance and intensity. Because light travels about a million times faster than sound, the distance in miles to a thunderstorm can be estimated by

counting the number of seconds between lightning and thunder, and dividing by five (sound travels about $\frac{1}{5}$ mile or 0.3 kilometers per second). Seldom will you hear thunder more than 5 miles from its source.

Protecting yourself from the threat of a thunderstorm is harder on days when the visibility is low. On clear days, you can spot storms from a long way off and take the necessary precautions. On hazy days, you don't know a storm is coming until it's upon you. If you're going to the beach, check the forecast and be prepared to move quickly if thunderstorms are expected.

A simple AM radio can warn beachgoers of impending storms and lightning problems. An increase in static (the crackling sound on your radio) may indicate that a storm is approaching.

How to Protect Yourself From Lightning

When you're on the beach, what can you do to protect yourself from lightning? Lifeguards, who are trained to watch the weather as well as the water, offer these tips:

- ◆ Stay out of the water.
- ◆ Leave beaches, piers, and boardwalks; seek shelter as soon as possible.
- ◆ If no building or other standing shelter is nearby, get in an automobile. Automobiles generally are safe and offer excellent lightning protection.
- ◆ If no shelter is available, seek the lowest spot you can find. Don't be the highest object on the horizon, and avoid open spaces. Don't sit under beach umbrellas.
- ◆ Stay away from metal objects. They will easily assume an induced charge and become a good candidate for a lightning strike. So don't handle metal objects like beach umbrellas or aluminum beach chairs.
- ◆ Just before lightning is about to strike, one feels a tingling sensation and all his hair stands on end. If that happens, the endangered person should squat down on his heels and cover his head with his hands. Such a crouch diffuses the impulse of the lightning bolt.

First Aid for Lightning Victims

Someone struck by lightning may be severely burned and may suffer cardiac arrest. However, not everyone struck by lightning dies—researchers estimate that two-thirds of those struck by lightning *survive*. The key to survival often has been the immediate availability of medical personnel, who know how to treat lightning victims. Thus, after a lightning strike, seek medical attention for the victim as soon as possible.

If lightning claims a victim while you are on the beach, call a lifeguard for help. Lifeguards are trained in both first aid and cardiopulmonary resuscitation (CPR). If no lifeguard is available and you are trained in CPR, these

are the steps to take. If the victim has been knocked unconscious, act immediately. (Note that the victim's body is electrically *neutral*—it carries no electrical charge and can be handled safely.) Check for breathing and heartbeat. If you feel a pulse, but no breathing, begin mouth-to-mouth resuscitation. If there is no heartbeat, begin CPR. A person apparently "killed" by lightning can often be revived by prompt, prolonged mouth-to-mouth resuscitation and cardiac massage.

The need for first aid and CPR training is critical when dealing with lightning victims. For more information about these lifesaving techniques, please contact your local chapter of the American Red Cross.

Finally, remember that the beach is a wonderful place in the summertime, for rest, relaxation, and fun. But beware of the potential dangers when thunderstorms arise. Knowing how to spot a thunderstorm and what you should do if you're caught in one will help ensure that your vacation is a pleasant experience and not a tragedy.

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