# Lightning

## What Causes Lightning?

Lightning is caused by the movement of water droplets and ice crystals inside a cumulonimbus cloud (thunderhead) which creates an electrical charge, with the positive charge (protons) forming at the top and the negative charge (electrons) forming at the bottom of the cloud.

A positive charge builds up on the ground beneath the cloud, attracted to the negative charge in the bottom of the cloud. The ground's positive charge concentrates around anything that sticks up - trees, mountains, tall buildings, umbrellas and even people! The positive charge streaming up from the ground connects with the negative charge reaching down from the clouds and a spark of lightning strikes.

## Amazing Facts about Lightning

1. A lightning bolt is about 29,000 degrees Celsius — roughly six times hotter than the surface of the Sun!
2. Lightning flashes more than 3 million times a day worldwide — that's about 40 times a second. Not all those flashes hit the ground — some happen between or inside clouds.
3. An average lightning bolt can release enough energy to operate a 100-watt light bulb for more than three months straight.
4. All that energy travels along a path about as wide as a thumb!
5. Lightning kills about 2000 people a year, so stay inside during lightning storms! The determining factor on whether a particular flash could be deadly depends on whether a person or animal is in the path of the lightning discharge.
6. You can use thunder to tell how far away a storm is. Next time you see a storm, count the number of seconds between when you see the lightning and hear the thunder. Take the number of seconds and divide by 5 and that will tell you how far away the storm is in miles. For example: If you counted 10 seconds between the lightning and the thunder, the lightning is 2 miles away!

| Types of Lightning | Description |
|---|---|
| **Cloud-to-ground lightning** | This lightning is the best known and third most common type of lightning. Most cloud-to-ground lightning strikes come from the negatively charged bottom of the cloud traveling to the positively charged ground below. Cloud-to-ground lightning bolts strike tall objects, like trees and buildings. These lightning strikes can cause fire and property damage. If you're the tallest object, then lighting can strike you. |
| **Cloud-to-air lightning** | Cloud-to-air lightning is referred to as a discharge or portion of a discharge jumping from a cloud into clear air. The most visually dramatic examples of cloud-to-air lightning occur when a long, bright lightning channel jumps out of the side of a cumulonimbus cloud and terminates in the clear air surrounding the storm. |
| **Inter-cloud and intra-cloud lightning** | When lightning happens between two separate clouds it is known as inter-cloud lightning, and when it happens within a single cloud it is known as intra-cloud lightning. Intra-cloud lightning is the most common type of lightning. This occurs when there are both positive and negative charges within the same cloud. Usually the process takes place within the cloud and looks like a bright flash of light which flickers. |
| **Forked Lightning** | Forked lighting appears as jagged lines of light. They can have several branches. Forked lightning can be seen shooting from the clouds to the ground, from one cloud to another cloud, or from a cloud out into the air. This lightning can strike up to 10 miles away from a thunderstorm. |
| **Ball Lightning** | Ball lightning is a rare form of lightning. It usually appears as a reddish, luminous ball, but can come in any colour. Ball lightning is usually spherical in shape and about 30cm in diameter. Hissing noises originate from such balls and they sometimes make a loud noise when they explode. |


## WHY DON'T ALL FISH DIE WHEN LIGHTNING HITS THE SEA?

Sea water conducts electricity so as soon as the current enters it, it spreads out in all directions and any fish in the way would probably only experience a small current passing through it, so sparing it from death. Only fish very near the water's surface would be killed. A fish as little as 30cm below the surface would probably be quite safe.

Think of it like this: If you poured a drop of blackcurrant juice into a teaspoon, you would see that it was a very dark purple colour. Now, if you poured that into a bath full of water, it would spread out and soon disappear completely. Lightning is just like that - when it hits the water, it spreads out straight away and becomes harmless to all but those at the very point where it entered the sea.

Fortunately, only very unlucky fish ever get killed by lightning.