

THunder and lightning

What is thunder?

Thunder is the loud noise which follows a flash of lightning. Lightning can be seen **before** thunder is heard as light travels faster than sound. The noise is caused by the rapid expansion of heating the air. You can normally hear thunder up to 6 miles (10km) away from the lightning flash. The sound can last quite a few seconds!



What is lightning?

Lightning can be seen virtually instantaneously. It takes 3 seconds to travel a kilometre. Lightning can be seen up to 50 miles away! The distance of a lightning flash can be estimated by counting the seconds between seeing the lightning and hearing the thunderstorm. Lightning is produced by discharges of electricity from cloud to cloud or from cloud to ground. A large positive charge builds up in the upper part of a thunder cloud and a negative charge builds up near the base of the cloud. When the potential difference between the charged areas becomes large enough, electrical energy is discharged and a flash of lightning occurs. Huge quantities of electricity are discharged in lightning flashes and temperatures of over 30,000°C or more can be reached!



What should you do in a thunderstorm?



In a thunderstorm you **should not** stand under a tree! Lightning tends to strike the highest point around and everything near this can be a target for the lightning too. Very few people survive being hit by lightning. To increase your safety in a thunderstorm you should avoid high ground, open spaces such as parks and golf courses, staying in a tent or shed, being within 30m of wire fences or using your umbrella! It is however safe to stay in the car...do you know why?! It is because the car acts as what is known as a *Faraday cage*, which is where lightning passes through the metal to the earth. If it is also raining it is better as the wet surface of the car helps to conduct the lightning to the earth.

Who discovered how to protect buildings from lightning?

Benjamin Franklin...in 1752 he flew a kite into a thunderstorm (don't do this; he put his life at risk!) but luckily he survived and invented the lightning conductor. A lightning conductor is a metal rod or piece of wire which electrical discharges and led harmlessly to earth. They can now be seen on church towers and spires, skyscrapers and other tall building to protect them from damage.

How can a thunderstorm form?

For thunderstorms to occur, cumulonimbus clouds are required. These are heavy, dense, towering clouds with tops shaped like anvils or vast plumes. Pilots tend to fly around these clouds if they can. They can fly around them as often they are only 10-12km in width. In cumulonimbus clouds weather such as heavy rain, lightning, hail, turbulence and strong winds can occur.



Storm factfile



About 44,000 thunderstorms occur on earth each day

The chance of being hit by lightning in the UK is 1 in 14 million which is about the same chance of winning the lottery!

There are over 100 lightning discharges to earth every second

2000 thunderstorms can be in progress on earth at any one second

The number of people killed in the UK each year by lightning is usually about 4

The most thundery part of the UK is the East Midlands where there are approximately 20 storms per year

The least thundery parts of the UK are northern Scotland, south-east Ireland and western Wales where the average number of storms per year is only 4!

There is fossil evidence lightning happened over 250 million years ago!

The most thundery places in the world are Indonesia, Central Africa and north-west South America, where thunder often takes place more than 200 times per year!

