

The National Weather Service has declared the week of June 21st through June 27th as LIGHTNING SAFETY AWARENESS WEEK. This is the second in a series of public information statements to be issued by the National Weather Service office in Hastings containing information on lightning and lightning safety.

The topic for today is Understanding the Science of Thunderstorms and Lightning. By definition, all thunderstorms contain lightning. Lightning is a giant spark of electricity that occurs within the atmosphere or between the atmosphere and the ground.

All thunderstorms go through various stages of growth, development, electrification, and dissipation. The process of thunderstorm development often begins early in the day when the sun heats the air near the ground and pockets of warmer air start to rise. When these pockets reach a certain level in the atmosphere, cumulus clouds start to form. Continued heating can cause these clouds to grow upward into the atmosphere, and may be one of the first indications of a developing thunderstorm.

As the cloud grows, precipitation forms within the cloud. Mostly ice crystals are found in the upper levels of the cloud, with a mixture of ice crystals and small hail the middle levels, and a mixture of rain and melting hail in the lower levels. Due to air movements and collisions between the precipitation particles near the middle of the cloud, the various particles become charged. The lighter ice crystals gather a positive charge and are carried upward into the upper part of the storm by the updraft. The heavier hail gathers a negative charge and falls toward the lower part of the storm.

The earth's surface normally has a slight negative charge. However, as the negative charges build up in the lower part of the storm, the ground beneath the base of the cloud and in the area immediately surrounding the cloud becomes positively charged. As the cloud moves, these induced positive charges on the ground follow the cloud like a shadow. Farther away from the cloud base, but under the positively charged anvil, the negative charge may be further induced.

In the initial stages of development, air acts as an insulator between the positive and negative charges. However, when the electrical potential between the positive and negative charges becomes too great, there is a discharge of electricity that we know as lightning.

As lightning passes through the air, it heats the air rapidly to temperatures considerably hotter than the surface of the sun. During a lightning discharge, the sudden heating of the air causes it to expand rapidly. This rapid expansion of the air causes a shock wave that we hear as thunder.

For additional information about lightning and lightning safety, visit the following website:

<http://www.lightningsafety.noaa.gov/>