



# Tornadoes

NOAA NATIONAL WEATHER SERVICE

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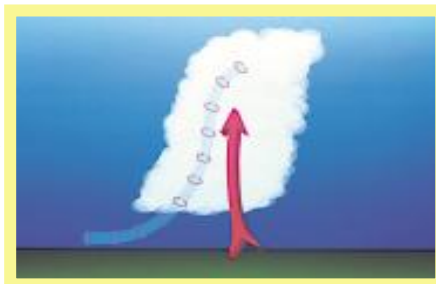
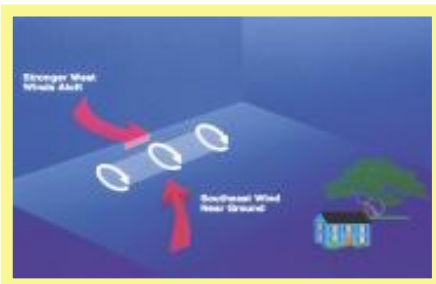
## What is a tornado?

A tornado is a violently rotating column of air extending from a thunderstorm to the ground. They may appear nearly transparent until dust, debris, or cloud formations are seen within the funnel.



## How do tornadoes form?

Before thunderstorms develop, a change in wind direction and an increase in wind speed with height create an invisible, horizontal spinning effect in the lower atmosphere. Rising air within the forming thunderstorm updraft tilts the rotating air from horizontal to vertical. An area of rotation, 2-6 miles wide, now extends through much of the storm. Most tornadoes form within this area of strong rotation.



## Tornado Season

Tornadoes can occur any time of the year. In southern states peak tornado occurrence is March through May, while peak months in northern states are late spring through summer. Tornadoes are most likely to occur between 3 and 9 p.m. but can happen at any time.







Tornadoes have occurred in every state, but are most frequent east of the Rocky Mountains. The average tornado moves from southwest to northeast, but they have been known to move in any direction.

## Tornadoes and Radar

Doppler radars located strategically across the U.S. detect air and object movement toward or away from the radar by sending radio waves and measuring the echoes received back. Some tornadoes are associated with common radar “signatures” such as the hook echo (left). Doppler velocities (right) indicate strong rotation where wind moving away from the radar (reds) and winds toward the radar (greens) are close together. Forecasters use these signatures along with other data to determine where tornadoes are likely and issue life-saving warnings.












# Tornado Safety

-  In a home or building, move to a pre-designated shelter, such as a basement
-  If an underground shelter is not available, move to a small interior room or hallway on the lowest floor and get under a sturdy piece of furniture.
-  Stay away from windows.
-  Mobile homes, even if tied down, offer little protection from tornadoes. Leave mobile homes and go to the lowest floor of a sturdy nearby building or a storm shelter.
-  If caught outdoors or in a vehicle, seek shelter in a basement, shelter or sturdy building.
-  If flying debris occurs while you are driving, pull over and park. Now you have the following options *as a last resort*:
  - Stay in the car with the seat belt on. Put your head down below the windows, covering with your hands and a blanket if possible.
  - If you can safely get noticeably lower than the level of the roadway, exit your car and lie in that area, covering your head with your hands.



Tornado Protection Position

## Safety in Schools

-  Develop an action plan with frequent drills.
-  Each school should be inspected and shelter areas designated by a registered engineer or architect. Basements offer the best protection. Schools without basements should use interior rooms and hallways on the lowest floor and away from windows.
-  Never shelter in gymnasiums, cafeterias, or auditoriums as they offer no protection from tornado-strength winds.
-  Each school should have a NOAA Weather Radio All-Hazards with battery back-up.
-  Use the protection position (shown above).
-  If the school's alarm system relies on electricity, have an alternative method to notify teachers and students in case of power failure.
-  Consider special provisions for portable classrooms and students with special needs.
-  Delay lunches or assemblies in large rooms if severe weather is anticipated.
-  Keep students at school until threatening weather passes. A building is safer than a bus or car.

Concrete Underground Storm Shelter



***The Bottom Line: Get low and inside.  
Minimize windows. Maximize walls.  
Protect yourself from debris.***

**On the web:**

- Tornado Frequently Asked Questions ..... [www.spc.noaa.gov/faq/tornado](http://www.spc.noaa.gov/faq/tornado)  
 National Weather Service ..... [www.weather.gov](http://www.weather.gov)  
 Red Cross Preparedness ..... [www.redcross.org](http://www.redcross.org)