A PREPAREDNESS GUIDE

Including Tornado Safety Information for Schools

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service

Introduction

For Americans, preparedness must now account for man-made disasters as well as natural ones. Knowing what to do during an emergency is an important part of being prepared and may make all the difference when seconds count.

Some of the things you can do to prepare for the unexpected, such as making an emergency supply kit and developing an emergency plan, are the same for both a natural or man-made emergency.

This preparedness guide explains thunderstorms and related hazards and suggests life-saving actions **YOU** can take. With this information, **YOU** can recognize severe weather, develop a plan, and be ready to act when threatening weather approaches. Remember, your safety, and the safety of those in your care, is up to **YOU!**

Why Worry About Thunderstorms?

Lightning...

- Causes an average of 55-60 fatalities and 400 injuries each year
- Occurs with all thunderstorms
- Costs more than $1 billion in insured losses each year

Tornadoes...

- Cause an average of 60-65 fatalities and 1,500 injuries each year
- Can produce wind speeds in excess of 200 mph
- Can be 1 mile wide and stay on the ground over 50 miles

Straight-line Winds...

- Can exceed 125 mph
- Can cause destruction equal to a tornado
- Are extremely dangerous to aviation

Flash Floods and Floods...

- Are the #1 cause of deaths associated with thunderstorms, more than 90 fatalities each year

Hail...

- Can be larger than a softball (5 inches in diameter)
- Causes more than $1 billion in crop and property damage each year

Thunderstorms

A thunderstorm affects a relatively small area when compared to a hurricane or a winter storm. The typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Despite their small size, **ALL** thunderstorms are dangerous! Of the estimated 100,000 thunderstorms that occur each year in the United States, about 10 percent are classified as severe.

The National Weather Service considers a thunderstorm severe if it produces hail at least one inch in diameter, winds of 58 mph or stronger, or a tornado.

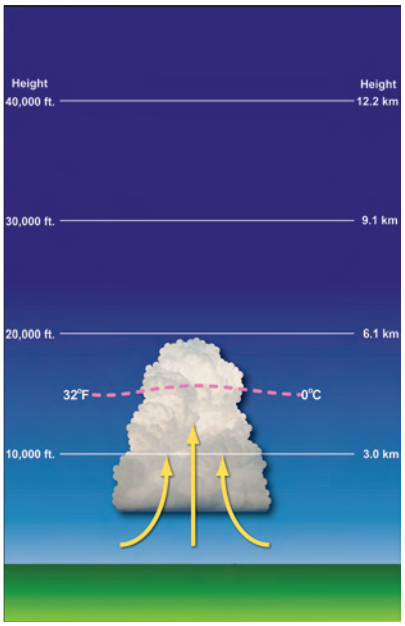
What Are Thunderstorms? What Causes Them?

Every Thunderstorm Needs:

- **Moisture—**to form clouds and rain
- **Unstable air**—warm air that can rise rapidly
- **Lift—**caused by cold or warm fronts, sea breezes, mountains, or the sun's heat

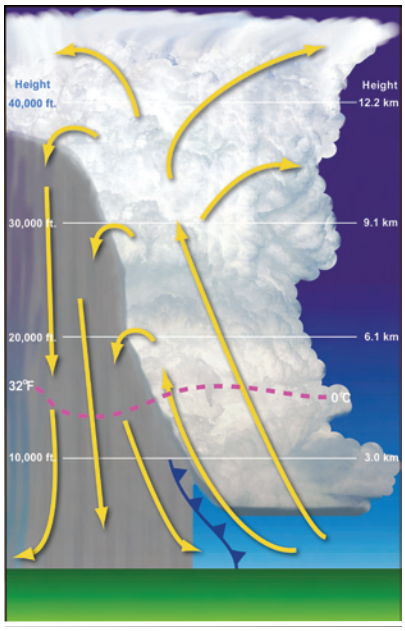
1,800 thunderstorms occur at any moment around the world. That's 16 million a year!

The Thunderstorm Life Cycle



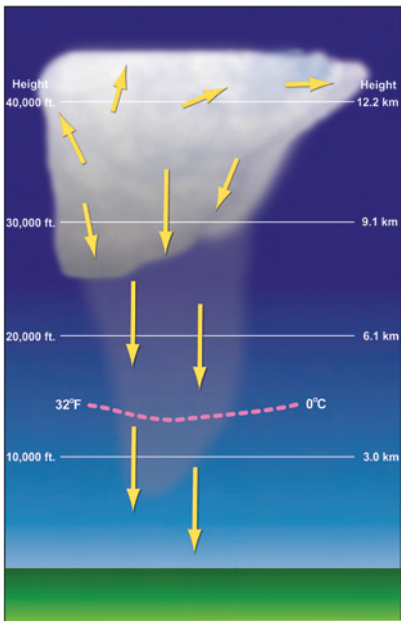
Developing Stage

- Towering cumulus cloud indicates rising air
- Usually little if any rain during this stage
- Lasts about 10 minutes
- Occasional lightning



Mature Stage

- Most likely time for hail, heavy rain, frequent lightning, strong winds, and tornadoes
- Storm occasionally has a black or dark green appearance
- Lasts an average of 10 to 20 minutes but some storms may last much longer



Dissipating Stage

- Downdrafts, downward flowing air, dominate the storm
- Rainfall decreases in intensity
- Can still produce a burst of strong winds
- Lightning remains a danger

Tornadoes

Although tornadoes occur in many parts of the world, they are found most frequently in the United States. In an average year, 1,200 tornadoes cause 60-65 fatalities and 1,500 injuries nationwide. You can find more information on tornadoes at www.spc.noaa.gov.

Tornado Facts

- A tornado is a violently rotating column of air extending from a cumuliform cloud, such as a thunderstorm, to the ground.
- Tornadoes may appear nearly transparent until dust and debris are picked up or a cloud forms within the funnel. The average tornado moves from southwest to northeast, but **tornadoes can move in any direction** and can suddenly change their direction of motion.
- The average forward speed of a tornado is 30 mph but may vary from nearly stationary to 70 mph.
- The strongest tornadoes have rotating winds of more than 200 mph.
- Tornadoes can accompany tropical storms and hurricanes as they move onto land.
- Waterspouts are tornadoes that form over warm water. Water spouts can move onshore and cause damage to coastal areas.

Be Ready Year Round

- Tornadoes can occur at any time of day, any day of the year.
- Have a plan of action before severe weather threatens. You need to respond quickly when a warning is issued or a tornado is spotted.
- When conditions are warm, humid, and windy, or skies are threatening, monitor for severe weather watches and warnings by listening to NOAA Weather Radio, logging onto weather.gov or tuning into your favorite television or radio weather information source.

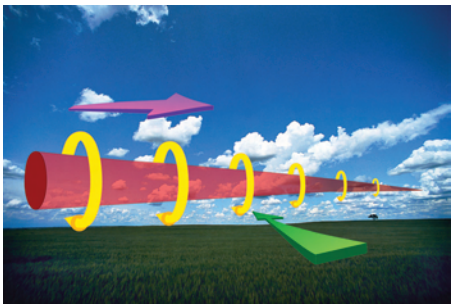
The Enhanced Fujita Scale

The National Weather Service (NWS) uses the EF-Scale to assign a tornado a 'rating' based on estimated wind speeds and related damage.

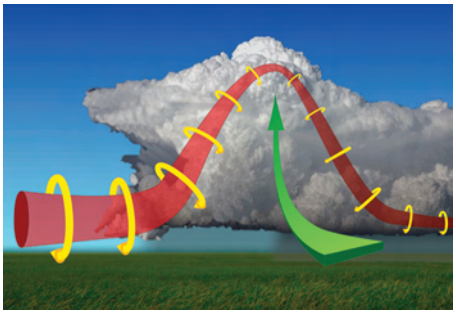
EF- SCALE	
EF RATING	3 Second Wind Gust (mph)
0	65-85
1	86-110
2	111-135
3	136-165
4	166-200
5	Over 200

How Tornadoes Form

Before thunderstorms develop, winds change direction and increase in speed with altitude. This creates an invisible, horizontal spinning effect in the lower atmosphere.



Rising air within the 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.

Chuck Doswell III

Weak Tornadoes

- 88% of all tornadoes
- Less than 5% of tornado deaths
- Lifetime 1 – 10+ minutes
- Winds less than 110 mph
- Produces EF0 or EF1 damage

Wikimedia/Justin Hobson

Strong Tornadoes

- 11% of all tornadoes
- Nearly 30% of all tornado deaths
- May last 20 minutes or longer
- Winds 111-165 mph
- Produces EF2 or EF3 damage

Wikimedia/Joshua Jans

Violent Tornadoes

- Less than 1% of all tornadoes
- 70% of all tornado deaths
- Can exceed 1 hour
- Winds greater than 166 mph
- Produces EF4 or EF5 damage

More detailed information on the EF-Scale can found at:
www.spc.noaa.gov/efscale

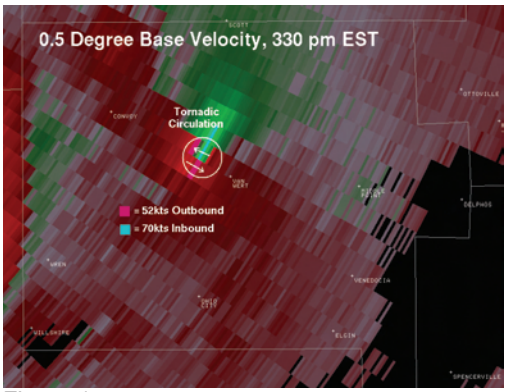


Figure 1

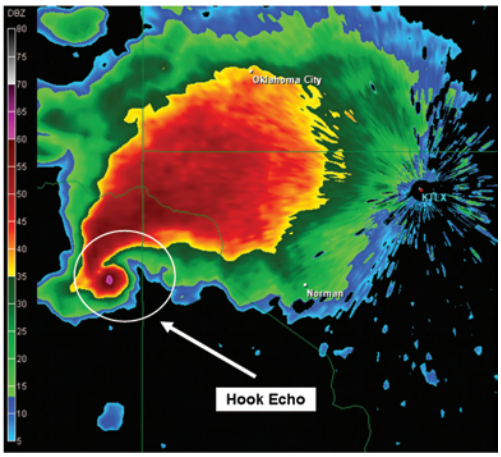


Figure 2

Figure 3 NOAA/Brian Bill

Weather Radar Watches the Sky

The NWS has a Doppler radar network strategically located across the country that can detect air movement toward or away from the radar. Early detection of increasing rotation aloft within a thunderstorm can allow life-saving warnings to be issued before the tornado forms. In Figure 1 Weather Service Doppler radar detected strong rotation within the storm where red colors (winds moving away from the radar) and green (winds blowing toward the radar) are close together. Figure 2 reveals the "hook echo" that appreared in the radar's reflectivity data. Figure 3 shows a violent tornado in northern Oklahoma at the same time the radar image was taken.

Tornado Fiction and Fact

FICTION:	Lakes, rivers, and mountains protect areas from tornadoes.
FACT:	No geographic location is safe from tornadoes. A tornado near Yellowstone National Park left a path of destruction up and down a 10,000 foot mountain.
FICTION:	A tornado causes buildings to "explode" as the tornado passes overhead.
FACT:	Violent winds and debris slamming into buildings cause the most structural damage.
FICTION:	Open windows before a tornado approaches to equalize pressure and minimize damage.
FACT:	Virtually all buildings leak. Leave the windows closed. Take shelter immediately. An underground shelter, basement or safe room are the safest places. If none of those options are available, go to a windowless interior room or hallway.
FICTION:	Highway overpasses provide safe shelter from tornadoes.
FACT:	The area under a highway overpass is very dangerous in a tornado. If you are in a vehicle, you should immediately seek shelter in a sturdy building. As a last resort, you can either: 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, OR 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. Your choice should be driven by your specific circumstances.
FICTION:	It is safe to take shelter in the bathroom, hallway, or closet of a mobile home.
FACT:	Mobile homes are not safe during tornadoes! Abandon your mobile home to seek shelter in a sturdy building immediately. If you live in a mobile home, ensure you have a plan in place that identifies the closest sturdy buildings.

Answers to frequently asked questions about tornadoes can be found at:
www.spc.noaa.gov/faq/tornado/index.html

Lightning

What Causes Lightning

The rising air in a thunderstorm cloud causes various types of frozen precipitation to form within the cloud. Included in these precipitation types are very small ice crystals and much larger pellets of snow and ice. The smaller ice crystals are carried upward toward the top of the clouds by the rising air while the heavier and denser pellets are either suspended by the rising air or start falling toward the ground. Collisions occur between the ice crystals and the pellets, and these collisions serve as the charging mechanism of the thunderstorm. The small ice crystals become positively charged while the pellets become negatively charged. As a result, the top of the cloud becomes positively charged and the middle to lower part of the storm becomes negatively charged. At the same time, the ground underneath the cloud becomes charged oppositely of the charges directly overhead.

When the charge difference between the ground and the cloud becomes too large, a conductive channel of air develops between the cloud and the ground, and a small amount of charge (step leader) starts moving toward the ground. When it nears the ground, an upward leader of opposite charge connects with the step leader. At the instant this connection is made, a powerful discharge occurs between the cloud and the ground. We see this discharge as a bright visible flash of lightning.

Johnny Autery

Lightning Facts

- There is no safe place outdoors when a thunderstorm is nearby.
- The vast majority of lightning victims were going to a safe place but waited too long before seeking safe shelter.
- More than 80% of lightning fatality victims are **male**, typically between the ages of 15 and 40.
- Lightning fatalities are most common during summer afternoons and evenings.
- The energy from one lightning flash could light a 100-watt light bulb for more than 3 months.
- Many wildfires in the western United States and Alaska are ignited by lightning.
- The channel of air through which lightning passes can be heated to 50,000°F—*hotter than the surface of the sun!* The rapid heating and cooling of the air near the lightning channel causes a shock wave that results in the sound we know as **"thunder."**

U.S. Air Force/Cherie A. Thurlby

How Far Away Is the Lightning?

- Count the number of seconds between a flash of lightning and the sound of the resulting thunder.
- Divide this number by 5 to get an estimate of the distance in miles to the lightning strike.
- Remember, if you are outdoors and can hear thunder, you are in danger of being struck by lightning.

Almost all lightning deaths have occurred outdoors. In recent years, fatal activities have included:

- boating
- riding horses
- riding on a lawnmower
- golfing
- walking
- mountain climbing
- camping
- standing under a tree
- swimming
- playing sports
- watching the storm
- loading a truck
- fishing
- running to shelter

Lightning Fiction and Fact

FICTION:	If it is not raining, then there is no danger from lightning.
FACT:	Lightning often strikes outside of heavy rain and may occur as far as 10 miles away from any rainfall. This is especially true in the western United States where thunderstorms sometimes produce very little rain.
FICTION:	The rubber soles of shoes or rubber tires on a car will protect you from being struck by lightning.
FACT:	Rubber-soled shoes and rubber tires provide NO protection from lightning. The steel frame of a hard-topped vehicle provides increased protection if you are not touching metal. Although you may be injured if lightning strikes your car, you are much safer inside a vehicle than outside.
FICTION:	People struck by lightning should not be touched because they carry an electrical charge.
FACT:	Lightning-strike victims carry no electrical charge and should be helped immediately. Anyone who has been hit by lightning requires immediate professional medical care. Call 9-1-1 and begin CPR immediately if the person has stopped breathing. Use an Automatic External Defibrillator if one is available. Contact your local American Red Cross chapter for information on CPR and first aid classes.
FICTION:	"Heat lightning" occurs after very hot summer days and poses no threat.
FACT:	"Heat lightning" is a term used to describe lightning from a thunderstorm too far away for the thunder to be heard.

NOAA/Bill Bunting

Straight-Line Winds

- Straight-line winds are any winds not associated with the rotation of a tornado. Straight-line winds are responsible for most thunder storm wind damage.
- Straight-line winds can exceed 125 mph!
- A downburst is a small area of rapidly descending air beneath a thunderstorm (see center of photographs above).
- A downburst can cause damage equivalent to a strong tornado (tree damage in photo to the right) and can be extremely hazardous to aviation.
- A "dry microburst" is a downburst that occurs with little or no rain. These destructive winds are most common in the western United States and are a hazard that wildfire crews watch-out for.

Flash Floods and Floods

USGS

- A **flash flood** occurs within a few hours (usually less than 6 hours) of heavy or excessive rainfall, a dam or levee failure, or the sudden release of water impounded by an ice jam.
- A **flood** is the inundation of a normally dry area caused by abnormal high water flow. Floods develop more slowly than flash floods, normally greater than 6 hours.
- Flash floods and floods are the #1 cause of deaths associated with thunderstorms, more than 90 fatalities each year.
- More than half of all flood-related drownings occur when a vehicle is driven into hazardous flood water.
  —TURN AROUND, DON'T DROWN!
- Many flash flood fatalities occur at night.
- **Six inches** of fast-moving water can knock you off your feet.
- **Two feet** of rushing water can carry away most vehicles, including SUVs and pickups.

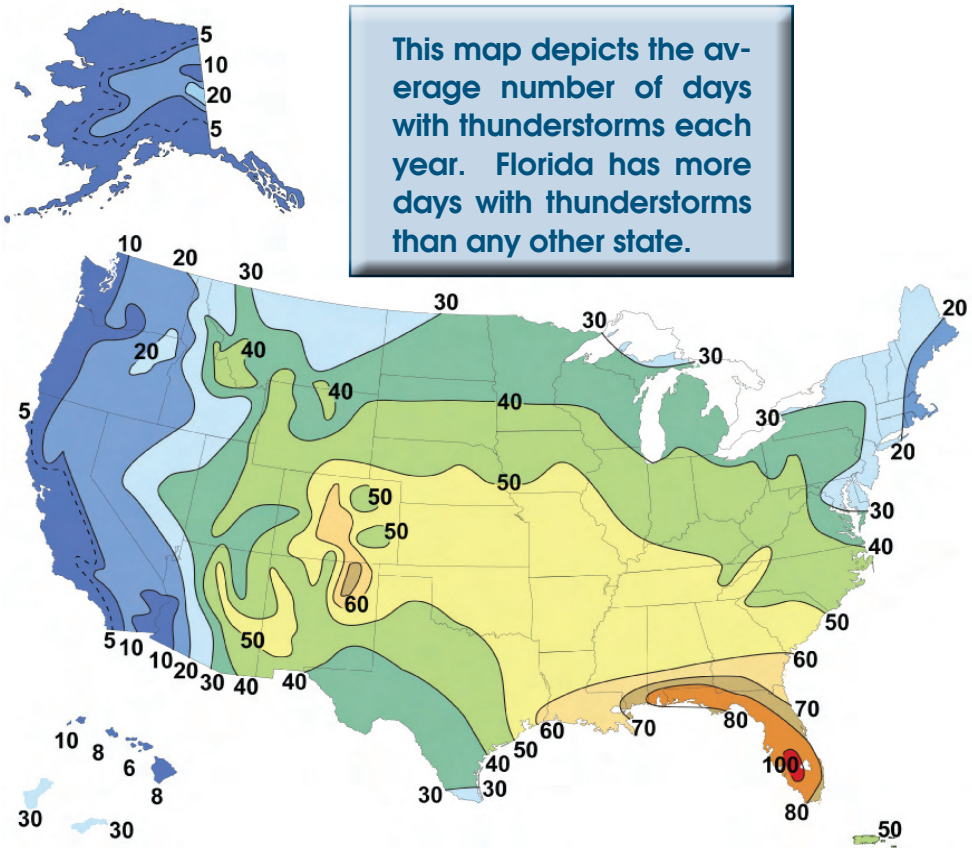
For more information, refer to the "Floods...The Awesome Power" at weather.gov/os/brochures.shtml

Hail

The Aurora, Nebraska record hailstone

- Strong rising currents of air within a storm, called updrafts, carry water droplets to a height where they freeze.
- Ice particles grow in size, becoming too heavy to be supported by the updraft, and fall to the ground.
- Hail is larger than sleet, and forms only in thunderstorms.
- Large hailstones can fall at speeds faster than 100 mph!
- The largest hailstone ever recovered in the United States was a 7 inch wide chunk of ice that landed in Aurora, Nebraska, in June 2003.
- An accurate weight could not be determined for the Aurora hailstone. A 1970 Coffeyville, Kansas, hailstone weighing 1.67 pounds with a 5.7 inch diameter remains the heaviest hailstone weighed and verified in the United States.

Who's Most At-Risk From Thunderstorms?



This map depicts the average number of days with thunderstorms each year. Florida has more days with thunderstorms than any other state.

From Tornadoes
People who are in mobile homes or outdoors.

From Lightning
People who are outdoors, or anyone who stays outdoors when thunderstorms are nearby.

From Flash Flooding
People who walk or drive through flood waters.

From Large Hail
People who are caught outdoors.

Be Prepared

It's Up to YOU!

Each year, many people are killed or seriously injured by tornadoes and severe thunderstorms despite advance warning. Some did not hear the warning; others heard the warning but did not believe it would happen to them. The following preparedness information, combined with timely severe weather watches and warnings, may save your life. If you hear a warning or observe threatening skies, only YOU can make the decision to seek safety. This could be the most important decision you will ever make.

Tom Warner

What YOU Can Do Before Severe Weather Strikes

Develop a plan for you and your family at home, work, school, and when outdoors. The American Red Cross offers tips at: www.redcross.org, and the Federal Emergency Management Agency (FEMA) at: www.ready.gov

Practice Your Plan

- Know the risk for the area in which you live or visit. NWS warnings identify locations in the path of approaching severe weather.
- Have a Public Alert™ certified NOAA Weather Radio and battery back-up to receive warnings.
- Discuss thunderstorm safety with all members of your household.
- NWS watches and warnings are available on the Internet. Select and bookmark your local NWS office from www.weather.gov.
- Keep in mind that even though the weather may be calm at the time a Tornado or Severe Thunderstorm Watch or Warning is issued for your area, conditions can rapidly deteriorate and become life threatening. Always heed warnings even if warnings issued for your area in the past did not result in severe weather. Don't gamble with your life.
- Tornadoes and severe thunderstorms can and do occur at any location, anytime of day or night, and anytime of year given the right atmospheric conditions.
- Tune into your favorite radio or television weather information source for severe weather watch and warning information.
- If severe weather threatens, check on people who are elderly, very young, or physically or mentally disabled.
- Having a safe room in your home or small business can help provide "near-absolute protection" for you and your family or your employees from injury or death caused by extreme winds. By near-absolute protection we mean that there is a very high probability the occupants of a safe room built according to current guidance will avoid injury or death. Information on how to build a Safe Room (shown in the photo at right) in your home or school is available from FEMA at: www.fema.gov/plan/prevent/saferoom/fema320.shtm

FEMA

Remember, if you can hear thunder – you are close enough to be struck by lightning!

When Dangerous Weather Approaches

Avoid the Lightning Threat

- **Have a lightning safety plan**. Know where you'll go for safety and how much time it will take to get there. Make sure your plan allows enough time to reach safety.
- **Postpone activities**. Before going outdoors, check the forecast for thunderstorms. Consider postponing activities to avoid being caught in a dangerous situation.
- **Monitor the weather**. Look for signs of a developing thunderstorm such as darkening skies, flashes of lightning, or increasing wind.
- **Get to a safe place**. If you hear thunder, even a distant rumble, immediately move to a safe place. ***When Thunder Roars, Go Indoors!*** Fully enclosed buildings with wiring and plumbing provide the best protection. Sheds, picnic shelters, tents or covered porches do not protect you from lightning. If a sturdy building is not nearby, get into a hard-topped metal vehicle and close all the windows. Stay inside until 30 minutes after the last rumble of thunder.
- **If you hear thunder, don't use a corded phone**. Cordless phones, cell phones and other wireless handheld devices are safe to use.
- **Keep away from electrical equipment, wiring and water pipes**. Sensitive electronics should be unplugged well in advance of thunderstorms. Don't take a bath, shower or use other plumbing during a thunderstorm.

When Caught Outside During Thunder

There is no safe place outside during a thunderstorm. Plan ahead to avoid this dangerous situation! If you're outside and hear thunder, the only way to significantly reduce your risk of becoming a lightning casualty is to get inside a substantial building or hard-topped metal vehicle as fast as you can. Remember, there is no substitute for getting to a safe place.

- **Avoid open areas and stay away from isolated tall trees, towers, or utility poles.** Do not be the tallest object in the area. Lightning tends to strike the tallest objects in the area.
- **Stay away from metal conductors such as wires or fences.** Metal does not attract lightning, but lightning can travel long distances through it.

For more information on lightning safety, please visit:
www.lightningsafety.noaa.gov

Tornado Safety Rules

- The safest place to be is an underground shelter, basement, or safe room.
- If no underground shelter or safe room is available, a small, windowless interior room or hallway on the lowest level of a sturdy building is the safest alternative.
- Mobile homes are not safe during tornadoes. Abandon mobile homes and go to the nearest sturdy building or shelter immediately.
- If you are caught outdoors, seek shelter in a basement, shelter or sturdy building. If you cannot quickly walk to a shelter:
  - Immediately get into a vehicle, buckle your seat belt and try to drive to the closest sturdy shelter.
  - If flying debris occurs while you are driving, pull over and park. Now you have the following options as a last resort:
    - *Stay in your vehicle 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.*
  - Your choice should be driven by your specific circumstances

Brian Peters

Occasionally tornadoes develop so rapidly that advance warning is not possible. Remain alert for signs of an approaching tornado such as a dark, often greenish sky, large hail, or a loud roar similar to a freight train.

Flash Flood Safety Rules

- Avoid driving, walking, or swimming in flood waters.
- Stay away from high water, storm drains, ditches, ravines, or culverts. Even moving water only six inches deep can knock you off your feet. Move to higher ground.
- Do not let children play near storm drains.
- If you come upon a flooded roadway never drive through it.

TURN AROUND DON'T DROWN!!!

For more information on flood safety, please visit: www.floodsafety.noaa.gov

USGS/Don Becker

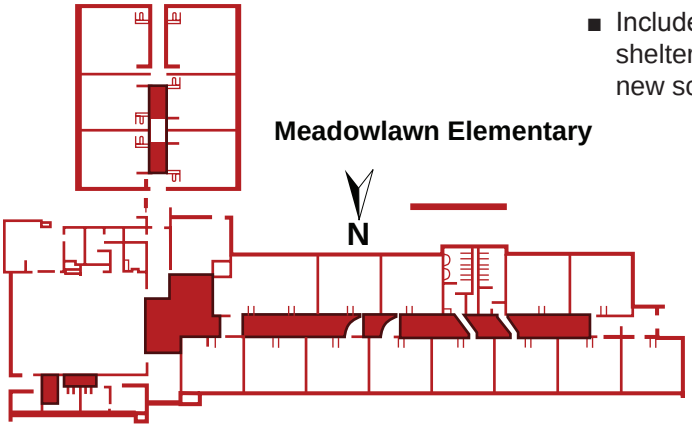
American Red Cross

Hospitals, nursing homes, and other institutions should develop similar severe weather safety plans.

Tornado Safety in Schools

Every School Should Have a Plan

- Develop a severe weather safety plan that ensures everyone will take cover within 60 seconds. Conduct frequent tornado drills. Include provisions for all after-hours, school-related activities.
- Every school should be inspected and tornado shelter areas designated by a registered engineer or architect. Rooms with exterior walls should never be used as tornado shelters.
- Basements offer the best protection. Schools without basements should use interior rooms and hallways on the lowest floor, away from windows.
- Delay lunches or assemblies in large rooms if severe weather is anticipated. Rooms with large roof spans (e.g., gymnasiums, cafeterias, and auditoriums) offer little or no protection from tornado-strength winds.
- Ensure students and staff know the protective position (shown below). Everyone should sit facing an interior wall, elbows to knees, and with hands over the back of their heads.
- Each school should have a NOAA Weather Radio with battery back-up. Remember, the NWS issues a Tornado Watch when conditions are *favorable for tornado development* and a Tornado Warning when a tornado *has been spotted or indicated by radar*.
- If the school's alarm system relies on electricity, have an alternative method to notify teachers and students in case of power failure.
- Make special provisions for faculty and students with disabilities, those in portable classrooms, and those outdoors. They should be notified first of approaching severe weather.
- Keep children at school beyond regular hours during a Tornado Warning. School bus drivers should identify protective areas along each part of their route where they and their passengers can take cover if overtaken by a tornado or high winds.
- Include properly designed tornado shelters when planning additions or new school buildings.



= "BEST AVAILABLE" Tornado Shelter

Stay Informed with NOAA Weather Radio All Hazards

The NWS continuously broadcasts warnings, watches, forecasts and other non-weather related hazard information on NOAA Weather Radio All Hazards (NWR). The average range of the 1000+ NWR transmitters in the United States is 40 miles, depending on topography. For the best performing NWR receivers, NWS suggests that you look at devices that have been certified to Public Alert™ standards. These radios meet certain technical standards and come with many features such as: Specific Area Message Encoding (SAME), a battery back-up, both audio and visual alarms, selective programming for the types of hazards you want to be warned for, and the ability to activate external alarm devices for people with disabilities. Like a smoke detector, an NWR can wake you in the middle of the night to alert you to a dangerous situation.

When conditions are favorable for severe weather to develop, a Severe Thunderstorm or Tornado Watch is typically issued. NWS meteorologists then use information from weather radar, Skywarn® spotters and other sources to issue Severe Thunderstorm and Tornado Warnings for areas where severe weather is imminent. Severe Thunderstorm and Tornado Warnings are disseminated through a variety of means, such as local radio and television station broadcasts, the Internet, and other communication services provided by America's Weather Industry. Warnings are also broadcast in the impacted area on NWR. Local emergency management and other public safety officials are notified because they lead your community's response to the hazard.

Working with our nation's Emergency Alert System (EAS), NWR is truly an "all hazards" radio network, making it a great source for comprehensive weather and emergency information. Please visit www.weather.gov/nwr for more information.

What to Listen for...

Tornado Watch—NWS meteorologists have determined that tornadoes are possible in your area. Remain alert for approaching storms. Know if your location is in the watch area by listening to NOAA Weather Radio, visiting www.weather.gov or by tuning into your favorite radio or television weather information broadcast stations.

Severe Thunderstorm Watch—NWS meteorologists have determined that severe thunderstorms are likely to occur in your area. Watch the sky and stay tuned for NWS warnings.

Tornado Warning—NWS meteorologists have determined that a tornado is occurring, or likely to occur within minutes, in the specified area. Warnings indicate imminent danger to life and property.

Severe Thunderstorm Warning—NWS meteorologists have determined that a severe thunderstorm is occurring or likely to occur. Warnings indicate imminent danger to life and property.

The NWS, FEMA and the American Red Cross work to inform community officials and the public about the dangers posed by tornadoes and severe thunderstorms. You can prepare for the possibility of tornadoes or severe thunderstorms by learning the safest places to seek shelter when at home, work, school, or outdoors. **Learn how to monitor and prepare for severe weather so that YOU can make better decisions when needed most!**

NWS Outlook = Get Ready

NWS Watch = Get Set

NWS Warning = STOP what you are doing and take action!

Severe thunderstorm outlooks are created by the Storm Prediction Center: www.spc.ncep.noaa.gov/products/outlook/

For the latest hazardous weather outlooks, please visit your local NWS Weather Forecast Office web site.

MAKE a PLAN

Everyone needs to prepare for the hazards that could affect their area. FEMA, the American Red Cross and the NWS urge every household to develop an emergency plan.

Where will your family and friends be when disaster strikes? They could be anywhere—at work, at school, or in the car. How will you find each other? Will you know if your children are safe? Disaster may force you to evacuate your neighborhood or keep you in your home. What would you do if basic services such as water, gas, electricity, or telephones were cut off?

Develop an Emergency Plan:

Know Your Risk

Gather information about hazards. Contact your local emergency management office, American Red Cross chapter and National Weather Service office. Find out what types of disaster could occur and how best to respond and protect yourself. Learn your community's warning signals and evacuation plans. FEMA has information about how to prepare for different hazards at: www.fema.gov/plan/index.shtm

Have a Plan

Discuss the information you have gathered and what you need to do to prepare for and respond to different emergencies. Pick two places to meet in case you are separated:

- A spot outside your home for an emergency, such as fire,
- A location away from your neighborhood in case you can't return home.

Choose an out-of-area emergency contact person as your "family check-in contact" for everyone to call if you get separated. Discuss what you would do if advised to evacuate. No matter where you are located, FEMA can help you create an effective emergency plan at: www.ready.gov/america/makeaplan/index.html

Be Prepared

- Post emergency telephone numbers by phones and in cell phones.
- Install safety features in your house, such as smoke alarms and fire extinguishers.
- Inspect your home for potential hazards (such as items that can move, fall, break, or catch fire) and correct them.
- Have your family learn basic safety measures, such as CPR and first aid; how to use a fire extinguisher; and how and when to turn off water, gas, and electricity in your home.
- Teach children how and when to call 911 or your local emergency medical services number.

- Keep enough supplies in your home to meet your needs for at least 3 days. Assemble an emergency supply kit with items you may need if evacuated. Store these supplies in sturdy, easy-to-carry containers, such as backpacks or duffle bags. Keep important family documents in a waterproof container. Keep a smaller emergency supply kit in your vehicle.

EMERGENCY SUPPLY KIT

Assemble the following items to create kits for use at home, the office, at school and in your vehicle:

- Water—1 gallon per person, per day (3-day supply for evacuation and 2 week supply for home)
- Food—a 3-day supply of non-perishable food for evacuation, 2-week supply for home
- Battery-powered or hand crank radio, and a "Public Alert Certified" NOAA Weather Radio and extra batteries for both
- Items for infants—including formula, diapers, bottles, pacifiers, powdered milk and medications not requiring refrigeration
- Items for seniors, people with disabilities and anyone with medical needs—including special foods, denture items, extra eyeglasses, hearing aid batteries, prescription and non-prescription medications that are regularly used, inhalers and other essential equipment
- Kitchen accessories—a manual can opener, mess kits or disposable cups, plates and utensils, utility knife, sugar and salt, aluminum foil and plastic wrap, resealable plastic bags
- One complete change of clothing and footwear for each person—including sturdy work shoes or boots, raingear and other items adjusted for the season, such as hats and gloves, thermal underwear, sunglasses, dust masks
- Sanitation and hygiene items—shampoo, deodorant, toothpaste, toothbrushes, comb and brush, lip balm, sunscreen, contact lenses and supplies and any medications regularly used, toilet paper, towelettes, soap, hand sanitizer, liquid detergent, feminine supplies, plastic garbage bags (heavy-duty) and ties (for personal sanitation), medium-sized plastic bucket with tight lid, disinfectant, household chlorine bleach
- Other essential items—paper, pencil, needles, thread, medicine dropper, whistle, emergency preparedness manual
- Several flashlights and extra, fresh batteries
- A first-aid kit

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For a national overview of hazards please visit: www.noaawatch.gov

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- Blankets or a sleeping bag for each person
- Entertainment—including games and books, favorite dolls and stuffed animals for small children
- A map of the area marked with places you could go and their telephone numbers
- An extra set of keys—including keys for vehicles and any properties owned
- Copies of important documents—including insurance information, driver's licenses, passports and work identification badges
- Copies of medical prescriptions
- Cash, coins and copies of credit cards
- Family and emergency contact information
- Matches in a waterproof container
- Cell phone with chargers
- Family and emergency contact information
- Pet supplies—consider preparing an emergency supply kit for your pets including:
  - **Food—**keep at least 3 days of food in an airtight, waterproof container.
  - **Water—**store at least 3 days of water specifically for your pets in addition to water you need for yourself and your family.
  - **Medicines and medical records—**keep an extra supply of medicines your pet takes on a regular basis in a waterproof container.
  - **First aid kit—**talk to your veterinarian about what is most appropriate for your pet's emergency medical needs. Most kits should include colton bandage rolls, bandage tape and scissors; antibiotic ointment; flea and tick prevention; latex gloves, isopropyl alcohol and saline solution. Include a pet first aid reference book.
  - **Collar with ID tag, harness or leash—** your pet should wear a collar with its rabies tag and identification at all times. Include a backup leash, collar and ID tag in your pet's emergency supply kit. In addition, place copies of your pet's registration information, adoption papers, vaccination documents and medical records in a clean plastic bag or waterproof container and also add them to your kit. You should also consider talking with your

veterinarian about permanent identification such as microchipping and enrolling your pet in a recovery database.

- **Crate or other pet carrier—**if you need to evacuate in an emergency situation take your pets and animals with you provided that it is practical to do so. In many cases, your ability to do so will be aided by having a sturdy, safe, comfortable crate or carrier ready for transporting your pet. The carrier should be large enough for your pet to stand, turn around and lie down.
- **Sanitation—**include pet litter and litter box if appropriate, newspapers, paper towels, plastic trash bags and household chlorine bleach to provide for your pet's sanitation needs. You can use bleach as a disinfectant (dilute nine parts water to one part bleach), or in an emergency you can also use it to purify water. Use 16 drops of regular household liquid bleach per gallon of water. Do not use scented or color safe bleaches, or those with added cleaners.
- **A picture of you and your pet together—**if you become separated from your pet during an emergency, a picture of you and your pet together will help you document ownership and allow others to assist you in identifying your pet. Include detailed information about species, breed, age, sex, color and distinguishing characteristics.
- **Familiar items—**include favorite toys, treats or bedding

For more information on preparing your pets please visit:
www.ready.gov/america/getakit/pets.html

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Practice and Maintain Your Plan

Ask questions to make sure everyone remembers meeting places, phone numbers, and safety rules. Conduct drills regularly. Test your smoke detectors and NOAA Weather Radio monthly and change the batteries at least once each year. Test and recharge your fire extinguisher(s) according to the manufacturer's instructions. Replace stored water and food every 6 months.

For More Information

Safety and preparedness materials can be viewed and downloaded at:
National Weather Service at: www.weather.gov/safety.php
Federal Emergency Management Agency at: www.ready.gov
American Red Cross at: www.redcross.org

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