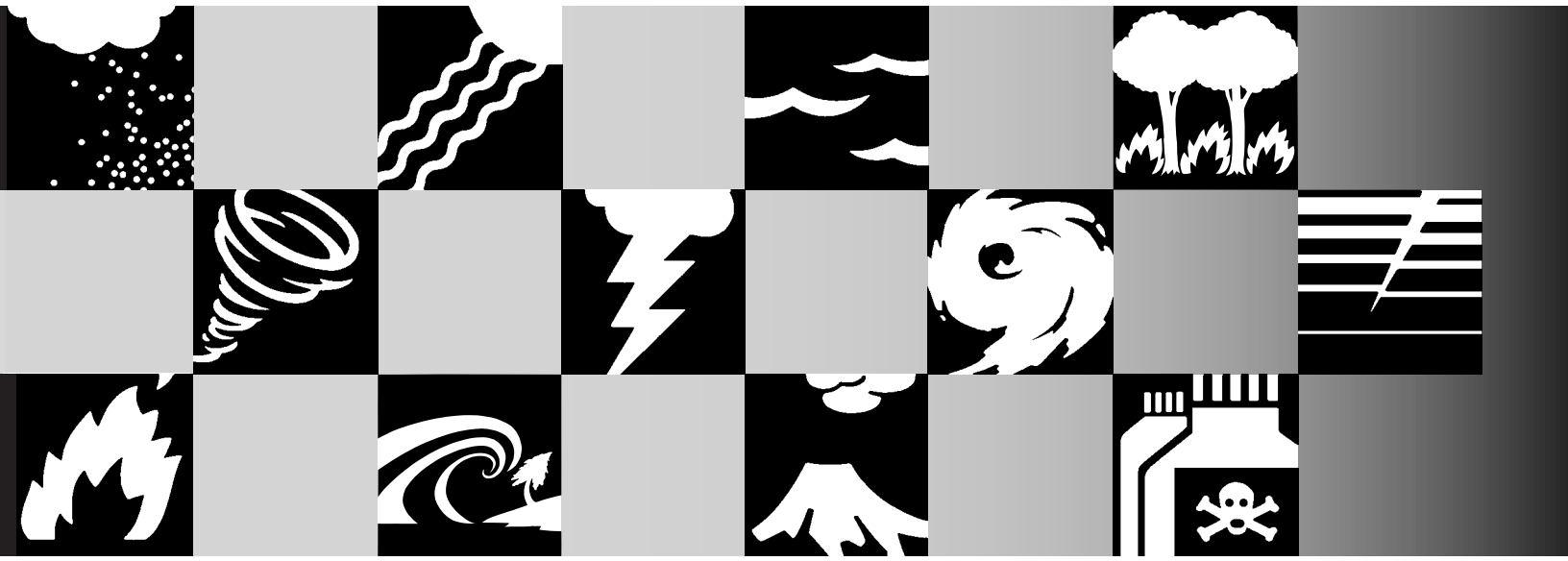
Talking About Disaster

Guide for Standard Messages



NFPA®

USGS science for a changing world

American Red Cross

Acknowledgments

Development of this document was made possible by a grant provided by the Lowes Home Safety Council, a nonprofit organization founded by Lowe's Home Improvement Warehouse with a vision of safer American homes.

This guide represents the hard work and collaboration of many professionals affiliated with the organizations that founded the National Disaster Education Coalition:

- American Red Cross.
- Federal Emergency Management Agency.
- NOAA/National Weather Service.
- National Fire Protection Association.
- U.S. Geological Survey.

Additional members of the National Disaster Education Coaliton include—

- Institute for Business and Home Safety.
- International Association of Emergency Managers.
- U.S. Department of Agriculture Cooperative State Research, Education, and Extension Service.

The content of this guide is in the public domain. Requested attribution is as follows:

From: *Talking About Disaster: Guide for Standard Messages*. Produced by the National Disaster Education Coalition, Washington, D.C., 1999.

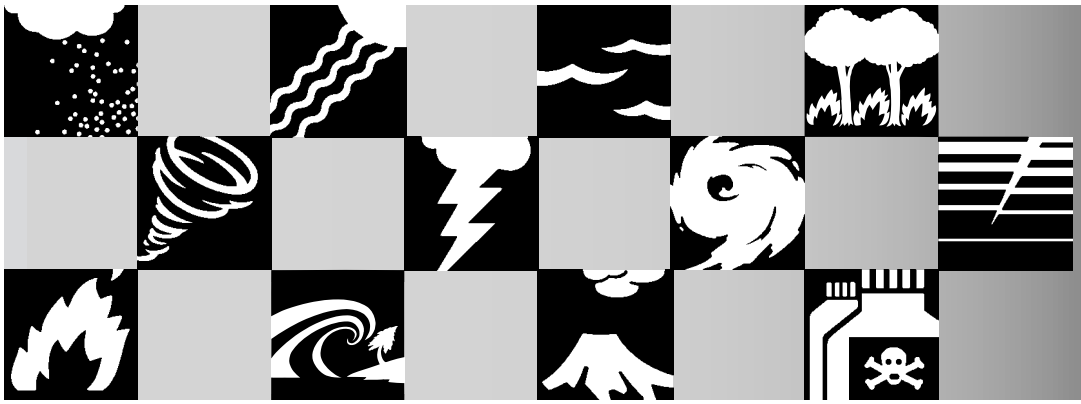
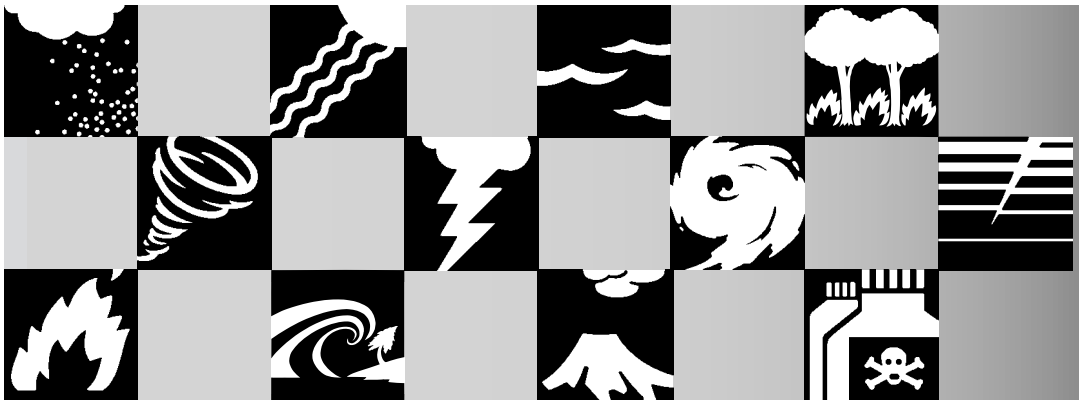


Table of Contents



Introduction and Purpose

This guide has been developed to assist anyone providing disaster safety information to the public. The information is based on historical data for the United States and is appropriate for use in the United States. Some information may not be applicable in other countries. Users of this guide may include emergency managers, meteorologists, teachers, disaster and fire educators, public affairs/public relations personnel, mitigation specialists, media personnel, and/or any other person in the severe-weather, earthquake, disaster, or communications communities. The safety information is intended for dissemination to the general public. If you would like more in-depth or scientific information, please contact your local emergency management office, local National Weather Service office, local American Red Cross chapter, state geological survey office, or the National Fire Protection Association.

The National Disaster Education Coalition is composed of:

- American Red Cross.
- Federal Emergency Management Agency.
- Institute for Business and Home Safety.
- International Association of Emergency Managers.
- National Fire Protection Association.
- National Weather Service.
- U.S. Department of Agriculture Cooperative State Research, Education, and Extension Service.
- U.S. Geological Survey.

We recognize that it is important for all agencies to deliver consistent disaster safety messages. As a result, the messages in this guide have been reviewed and approved by these national organizations, which work to

deliver disaster preparedness information to the public. Following each message are explanations, statistics, or reasons that reinforce the credibility of the message and that correct myths and misinformation.

Many affiliates of the American Red Cross, Federal Emergency Management Agency, National Fire Protection Association, National Weather Service, and U.S. Geological Survey have contributed to this guide, and the national organizations encourage the use by their affiliates or members of the messages in this guide.

The messages are intended to be used in educational presentations, displays and bulletin boards, print and electronic media, radio and television, and in any other medium in which disaster safety is communicated to the public. The information is in the public domain and is intended to be used and shared without copyright restrictions. If you wish to cite the source when you use this material, the following is suggested: From: *Talking About Disaster: Guide for Standard Messages*. Produced by the National Disaster Education Coalition, Washington, D.C., 1999.

Using This Guide

This guide provides disaster safety messages. Each message describes a recommended action or behavior. When you wish to deliver disaster safety messages to an audience, the messages should be worded in a positive manner that helps those hearing or reading the message know how to *act.* For example, in fire education, instead of saying, "Do not panic," you might say, "Remain calm; leave the building as safely and quickly as you can." This allows those hearing or reading the message to focus on what they can and should do in case of fire. For this message, you might next offer submessages on what "safely" means (crawl low through smoke, feel doors before opening, etc.).

In addition to action messages, awareness messages can be used to introduce a topic. An awareness message raises the awareness level of audience members, helping them to realize that disasters *can* and *do* happen in their communities and that they *can* do something to prepare for and lessen the effects of a disaster. Good examples of awareness messages include testimonials from neighbors and local statistics because they bring the reality of disaster close to home. Everyone has seen photos of horrific disasters on the evening news, but people often do not perceive them as real or as local; in fact, for some people, seeing too much "disaster news" can actually heighten their denial. They may feel they do not have any control or they cannot do anything to protect themselves or their property.

To use this guide, you should first get to know the audience who will be receiving the messages. Remember to consider the audience members' ages and socioeconomic, ethnic, and educational backgrounds. Be sensitive to specific audience groups. Audience members who are struggling to provide food for their families will not be interested in purchasing supplies; members who learned safety actions to take in their native country may be

wary of information that contradicts what they were previously told. It is also important to consider your area's specific hazards and disaster history. The East Coast will not prepare for volcanic eruptions, and the West Coast will not prepare for hurricanes.

Audiences vary and, therefore, it is difficult to define messages as specific to one type of audience. Only by evaluating your audience will *you* be able to determine which messages are most appropriate.

Messages relevant to children have been provided where appropriate. Young children will be more apt to learn a task they can *do*, such as stop, drop, and roll. Including children in family disaster preparedness planning will help them understand what disasters are and why it is important to prepare. They will also learn how being prepared can help protect them should a disaster occur.

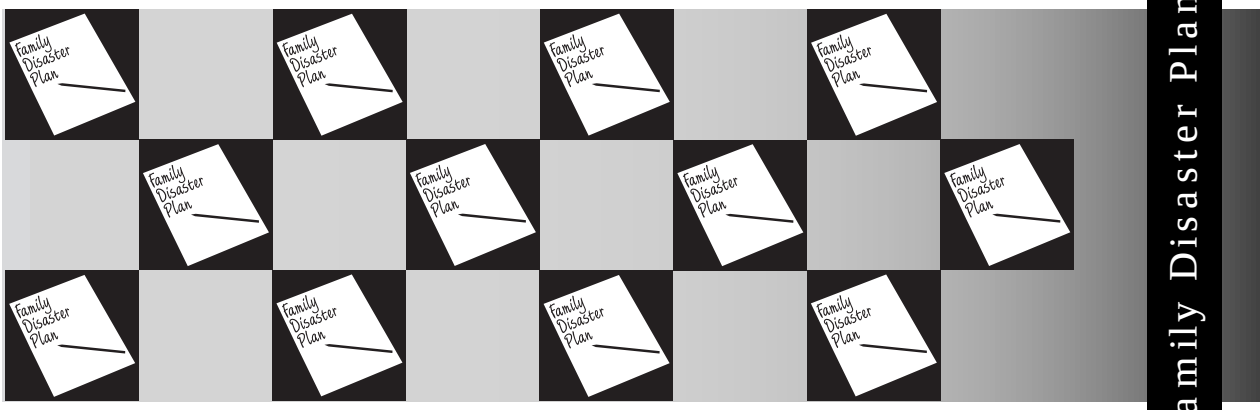
People with disabilities and elderly people who have difficulty moving quickly should prepare like anyone else. There are some additional considerations for them in the "Family Disaster Plan" section.

If you will be making a presentation, developing a news release, or writing an article for a newspaper or bulletin, it is recommended that you determine the hazard or topic you wish to discuss, locate the section appropriate to that topic, and select three to seven relevant messages. Design your presentation or news release around your chosen messages, providing submessages and supporting and/or background information as necessary. If time or space is limited, evaluate your audience and the chosen topic to determine the most important messages. For disasters with little or no warning, what to do during the disaster is generally most important. For disasters with plenty of warning time, preparation may be most important. If you will be conducting multiple presentations or classes for the same group, you may choose to use several sections of this document with many messages, spread out over time.

Within each section you will find that specific messages are in boldface. There may be one basic message with several submessages under it. Following each message there may be supporting information, including information about why the message is important. In addition, there may be an explanation of why some commonly provided messages may be inappropriate.

Whatever your message, using physical props to make your presentation interactive will provide the greatest learning experience.

If you would like further information, brochures, or materials about disaster safety, or information about developing community disaster education presentations, you may contact any of the National Disaster Education Coalition member agencies or their local counterparts. Please see the "Resources" section for contact information. Keep in mind that the local affiliates of these national agencies may have additional resources and information specific to your community.



Family Disaster Plan

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/ CSREES, and USGS

Why talk about a Family Disaster Plan?

Disaster can strike quickly and without warning. It can force you to evacuate your neighborhood or confine you to your home. What would you do if basic services, such as water, gas, electricity, or telephones were cut off? Local officials and relief workers will be on the scene after a disaster, but they cannot reach everyone right away.

Families can and do cope with disaster by preparing in advance and working together as a team. Knowing what to do is your best protection and your responsibility. Learn more about Family Disaster Plans by contacting your local emergency management office or American Red Cross chapter.

Awareness Information

- A National Weather Service (NWS) WATCH is a message indicating that conditions favor the occurrence of a certain type of hazardous weather. For example, a severe thunderstorm watch means that a severe thunderstorm is expected in the next six hours or so within an area approximately 120 to 150 miles wide and 300 to 400 miles long (36,000 to 60,000 square miles). The NWS Storm Prediction Center issues such watches. Local NWS forecast offices issue other watches (flash flood, winter weather, etc.) 12 to 36 hours in advance of a possible hazardous-weather or flooding event. Each local forecast office usually covers a state or a portion of a state.

Families can and do cope with disaster by preparing in advance and working together as a team. Knowing what to do is your best protection and your responsibility.

- An NWS WARNING indicates that a hazardous event is occurring or is imminent in about 30 minutes to an hour. Local NWS forecast offices issue warnings on a county-by-county basis.

Four Steps to Safety

Complete four steps to safety. There are four basic steps to developing a family disaster plan:

1. **Find out what could happen to you.** By learning what your risks may be, you can prepare for the disaster most likely to occur in your area. Learn more by contacting your local emergency management office or American Red Cross chapter. Be prepared to take notes. Ask the following:

   - What type of disasters are most likely to happen in your community? Identify which human-caused or technological disasters can affect your region, too. Remember to consider major chemical emergencies that can occur anywhere chemical substances are stored, manufactured, or transported.
   - How should you prepare for each?
   - Does your community have a public warning system? What do your community's warning signals sound like and what should you do when you hear them?
   - What about animal care after disaster? Pets (other than service animals) are not permitted in places where food is served, according to many local health department regulations. Plan where you would take your pets if you had to go to a public shelter where they are not permitted.
   - If you care for elderly or disabled persons, how can you help them? What might be some special needs to consider?
   - What are the disaster plans at your workplace, your children's school or day care center, and other places where members of your family spend time? You should be prepared wherever you may be when disaster strikes and learn steps you can take to prevent or avoid disasters.

2. **Create a Family Disaster Plan.** Once you know what disasters are possible in your area, talk about how to prepare and how to respond if one occurs. Make checklists of steps you can take as you discuss this information with your family.

Here is how to create your Family Disaster Plan:

- Meet with your family and discuss why you need to prepare for disaster. Explain the dangers of fire, severe weather, and earthquakes to children. Plan to share responsibilities and work together as a team. Keep it simple enough so people can remember the important details. A disaster is an extremely stressful situation that can create confusion. The best emergency plans are those with very few details.

- Discuss the types of disasters that are most likely to happen. Explain what to do in each case. Everyone should know what to do in case all family members are not together. Discussing disasters ahead of time will help reduce fear and anxiety and will help everyone know how to respond.
- Pick two places to meet:
  i. Right outside of your home in case of a sudden emergency, like a fire.
  ii. Outside of your neighborhood in case you can't return home or are asked to leave your neighborhood. Everyone must know the address and phone number of the meeting locations.
- Develop an emergency communication plan. In case family members are separated from one another during floods or other disasters, have a plan for getting back together. Separation is a real possibility during the day when adults are at work and children are at school.
- Ask an out-of-town relative or friend to be your "family contact." Your contact should live outside of your area. After a disaster, it is often easier to make a long distance call than a local call. Family members should call the contact and tell him or her where they are. Everyone must know the contact's name, address, and phone number.
- Discuss what to do if authorities ask you to evacuate. Make arrangements for a place to stay with a friend or relative who lives out of town and/or learn about shelter locations.
- Be familiar with escape routes. Depending on the type of disaster, it may be necessary to evacuate your home. Plan several escape routes in case certain roads are blocked or closed. Remember to follow the advice of local officials during evacuation situations. They will direct you to the safest route; some roads may be blocked or put you in further danger.
- Plan how to take care of your pets. Pets (other than service animals) are not permitted to be in places where food is served, according to many local health department regulations. Plan where you would take your pets if you had to go to a public shelter where they are not permitted.

3. Complete your checklists. Take the steps outlined in the checklists you made when you created your Family Disaster Plan. Remember to include the following items on your checklists.

- Post by phones emergency telephone numbers (fire, police,

ambulance, etc.). You may not have time in an emergency to look up critical numbers.

- Teach all responsible family members how and when to turn off the water, gas, and electricity at the main switches or valves. Keep necessary tools near gas and water shut-off valves. Turn off utilities only if you suspect a leak or damaged lines, or if you are instructed to do so by authorities. If you turn the gas off, you will need a professional to turn it back on. Paint shut-off valves with white or fluorescent paint to increase visibility. Attach a shut-off valve wrench or other special tool in a conspicuous place close to the gas and water shut-off valves.
- Check if you have adequate insurance coverage. Ask your insurance agent to review your current policies to ensure that they will cover your home and belongings adequately. Homeowner's insurance does not cover flood losses. If you are a renter, your landlord's insurance does not protect your personal property; it only protects the building. Renters' insurance pays if a renter's property is damaged or stolen. Renters' insurance costs less than $15 a month in most areas of the country. Contact your insurance agent for more information.
- Install smoke alarms on each level of your home, especially near bedrooms. Smoke alarms cut nearly in half your chances of dying in a home fire. Smoke alarms sense abnormal amounts of smoke or invisible combustion gases in the air. They can detect both smoldering and flaming fires. Many areas are now requiring hard-wired smoke alarms in new homes.
- Get training from the fire department on how to use your fire extinguisher (A-B-C type), and show family members where extinguishers are kept. Different extinguishers operate in different ways. Unless responsible family members know how to use your particular model, they may not be able to use it effectively. There is no time to read directions during an emergency. Only adults should handle and use extinguishers.
- Conduct a home hazard hunt. During a disaster, ordinary objects in your home can cause injury or damage. Anything that can move, fall, break, or cause a fire is a home hazard. For example, during an earthquake or a tornado, a hot water heater or a bookshelf could turn over or pictures hanging over a couch could fall and hurt someone. Look for electrical, chemical, and fire hazards. Contact your local fire department to learn about home fire hazards. Inspect your home at least once a year and fix potential hazards.

- Stock emergency supplies and assemble a Disaster Supplies Kit. (See the "Disaster Supplies Kit" section.) Keep enough supplies in your home to meet your needs for at least three days. Assemble a Disaster Supplies Kit with items you may need in case of an evacuation. Store these supplies in sturdy, clearly labeled, easy-to-carry containers, such as backpacks or duffel bags.
- Keep a smaller Disaster Supplies Kit in the trunk of your car. (See the "Disaster Supplies Kit" section.) If you become stranded or are not able to return home, having these items will help you to be more comfortable.
- Keep a portable, battery-operated radio or television and extra batteries. Maintaining a communications link with the outside is a step that can mean the difference between life and death. Make sure that all family members know where the portable, battery-operated radio or television is located, and always keep a supply of extra batteries.
- Consider using a NOAA Weather Radio with a tone-alert feature. NOAA Weather Radio is the best means to receive warnings from the National Weather Service. The National Weather Service continuously broadcasts updated weather warnings and forecasts that can be received by NOAA Weather Radios, which are sold in many stores. NOAA Weather Radio now broadcasts warning and postevent information for all types of hazards — both natural (such as weather and flooding, as well as earthquakes and volcanic activity) and technological (such as chemical releases or oil spills). Working with other federal agencies and the Federal Communications Commission's new Emergency Alert System, NOAA Weather Radio is an "all hazards" radio network, making it the single source for the most comprehensive weather and emergency information available to the public. Your National Weather Service recommends purchasing a NOAA Weather Radio that has both a battery backup and a Specific Area Message Encoder (SAME) feature, which automatically alerts you when a watch or warning is issued for your county, giving you immediate information about a life-threatening situation. The average range is 40 miles, depending on topography. The NOAA Weather Radio signal is a line-of-sight signal, which does not bore through hills or mountains.
- Take a Red Cross first aid and CPR class. Have your family learn basic safety measures, such as CPR and first aid. These are critical skills, and learning can be a fun activity for older children.
- Plan home escape routes. Determine the best escape routes from your home in preparation for a fire or other emergency that

would require you to leave the house quickly. Find two ways out of each room.

- Find the safe places in your home for each type of disaster. Different disasters often require different types of safe places. While basements are appropriate for tornadoes, they could be deadly in a major chemical emergency.
- Make two photocopies of vital documents and keep the originals in a safe deposit box. Keep one copy in a safe place in the house, and give the second copy to an out-of-town friend or relative. Vital documents such as birth and marriage certificates, tax records, credit card numbers, financial records, and wills and trusts can be lost during disasters.
- Make a complete inventory of your home, garage, and surrounding property. The inventory can be either written or videotaped. Include information such as serial numbers, make and model numbers, physical descriptions, and price of purchases (receipts, if possible). This list could help you prove the value of what you owned if your possessions are damaged or destroyed and can help you to claim deductions on taxes. Be sure to include expensive items such as sofas, chairs, tables, beds, chests, wall units, and any other furniture too heavy to move. Do this for all items in your home, on all levels. Then store a copy of the record somewhere away from home, such as in a safe deposit box.

4. Practice and maintain your plan. Practicing your plan will help you instinctively make the appropriate response during an actual emergency. You will need to review your plan periodically and you may need to change some parts.

- Quiz your kids every six months so they remember what to do, meeting places, phone numbers, and safety rules.
- Conduct fire and emergency evacuation drills at least twice a year. Actually drive evacuation routes so each driver will know the way. Select alternate routes in case the main evacuation route is blocked during an actual disaster. Mark your evacuation routes on a map; keep the map in your Disaster Supplies Kit. Remember to follow the advice of local officials during evacuation situations. They will direct you to the safest route, away from roads that may be blocked or put you in further danger.
- Replace stored food and water every six months. Replacing your food and water supplies will help ensure freshness.
- Use the test button to test your smoke alarms once a month. The test feature tests all electronic functions and is safer than testing with a controlled fire (matches, lighters, or cigarettes). If necessary,

replace batteries immediately. Make sure children know what your smoke alarm sounds like.

- If you have battery-powered smoke alarms, replace batteries at least once a year. Some agencies recommend you replace batteries when the time changes from standard daylight savings each spring and again in the fall. "Change your clock, change your batteries," is a positive theme and has become a common phrase. While replacing batteries this often certainly will not hurt, available data show that batteries will last at least a year, so more frequent replacement is not necessary, and time does not change in Arizona, Hawaii, the eastern portion of Indiana, Puerto Rico, American Samoa, and Guam.
- Replace your smoke alarms every 10 years. Smoke alarms become less sensitive over time. Replacing them every 10 years is a joint recommendation by the National Fire Protection Association and the U.S. Consumer Products Safety Commission.
- Look at your fire extinguisher to ensure it is properly charged. Fire extinguishers will not work properly if they are not properly charged. Use the gauge or test button to check proper pressure. Follow manufacturer's instructions for replacement or recharging fire extinguishers. If the unit is low on pressure, damaged, or corroded, replace it or have it professionally serviced.

What to Tell Children

- Tell children that a disaster is something that happens that could hurt people, cause damage, or cut off utilities such as water, telephones, or electricity. Explain to them that nature sometimes provides "too much of a good thing" — fire, rain, wind, snow. Talk about typical effects that children can relate to, such as loss of electricity, water, and telephone service.
- Give examples of several disasters that could happen in your community. Help children recognize the warning signs for the disasters that could happen in your community. Discussing disaster ahead of time reduces fear and anxiety and lets everyone know how to respond.
- Teach children how and when to call for help. Check the telephone directory for local emergency telephone numbers. If you live in a 9-1-1 service area, teach children to call 9-1-1. At home, post emergency telephone numbers by all phones and explain when to call each number. Even very young children can be taught how and when to call for

emergency assistance. If a child can't read, make an emergency telephone number chart with pictures that may help the child identify the correct number to call.

- Explain that when people know what to do and practice in advance, everyone is better able to handle emergencies. That's why you need to create a Family Disaster Plan.
- Have older children take a first aid and CPR course. These are critical skills, and learning can be a fun activity.
- Tell children that in a disaster there are many people who can help them. Talk about ways that an emergency manager, Red Cross volunteer, police officer, firefighter, teacher, neighbor, doctor, or utility worker might help following a disaster.
- Teach children to call your family contact in case they are separated from the family in an emergency. Help them memorize the telephone number, or write it down on a card that they can keep with them.

Remember Your Pets

- Plan how to take care of your pets. If you must evacuate, it is best to take your pets with you. However, pets (other than service animals) are not permitted in public shelters, according to many local health department regulations and because of other considerations.
- Contact hotels and motels outside of your immediate area to check their policies on accepting pets and restrictions on the number, size, and species. Ask if "no pet" policies could be waived in an emergency.
- Ask friends, relatives, or others outside of the affected area whether they could shelter your animals. If you have more than one pet, they may be more comfortable if kept together, but be prepared to house them separately.
- Prepare a list of boarding facilities and veterinarians who could shelter animals in an emergency; include 24-hour phone numbers. Ask local animal shelters if they provide emergency shelter or foster care for pets in a disaster. Animal shelters may be overburdened, so this should be your last resort.
- Keep a list of "pet friendly" places, including their phone numbers, with other disaster information and supplies. If you have notice of an impending disaster, call ahead for reservations.
- Carry pets in a sturdy carrier. Animals may feel threatened by some disasters and become frightened or try to run.

- Have identification, collar, leash, and proof of vaccinations for all pets. Veterinarian records may be required by some locations before they will allow you to board your pets. If your pet is lost, identification will help officials return it to you.
- Assemble a portable pet disaster supplies kit. Keep food, water, and any special pet needs in an easy-to-carry container.
- Have a current photo of your pets in case they get lost.
- As a last resort, if you absolutely must leave your pets behind, prepare an emergency pen in the home that includes a three-day supply of dry food and a large container of fresh water.

Media and Community Education Ideas

- Meet with your neighbors to plan how the neighborhood could work together after a disaster until help arrives. Working with neighbors can save lives and property. If you're a member of a neighborhood organization, such as a homeowner's association or crime watch group, introduce disaster preparedness as a new activity. Check with your local fire department to find out if they offer Community Emergency Response Team (CERT) training.
- Know your neighbors' special skills (for example, medical, technical) and consider how you could help neighbors who have special needs, such as disabled and elderly persons.
- Identify elderly and disabled people in the neighborhood. Ask them how you can help if a disaster threatens (transportation, securing the home, getting medications, etc.).
- Make plans for child care in case parents can't get home.

Evacuation

- Evacuate immediately if told to do so. Authorities do not ask people to leave unless they truly feel lives may be in danger. Follow their advice.
- Listen to local radio or television and follow the instructions of local emergency officials. Local officials will provide you with the most appropriate advice for your particular situation.
- Wear protective clothing and sturdy shoes. Disaster areas and debris contain many hazards. The most common injury following disasters is cut feet.
- Lock your home. Others may evacuate after you or before you return. Secure your house as you normally would when leaving for extended periods.

- Use travel routes specified by local authorities. Don't use shortcuts because certain areas may be impassable or dangerous.

If you have only moments before leaving, grab the following items and go:

  - First aid kit, including prescription medications, dentures, extra eyeglasses, and hearing aid batteries.
  - Disaster Supplies Kit basics and Evacuation Supplies Kit. (See "Disaster Supplies Kit" section for detailed information.)
  - A change of clothes and a sleeping bag or bedroll and pillow for each household member.
  - Car keys and keys to the place you may be going (friend's or relative's home).

If you're sure you have time and if local officials haven't advised an immediate evacuation, but there's a chance the weather may get worse or flooding may happen, take steps to protect your home and belongings:

- Bring all pets into the house and confine them to one room, if you can. If necessary, make arrangements for your pets. Pets may try to run if they feel threatened. Keeping them inside and in one room will allow you to find them quickly if you need to leave.
- Put your Disaster Supplies Kit basics and Evacuation Supplies Kit in your vehicle, or by the door if you may be leaving on foot. In some disaster situations, such as tsunami, it is better to leave by foot.
- Notify your family contact where you are going and when you expect to get there. Relatives and friends will be concerned about your safety. Letting someone know your travel plans will help relieve the fear and anxiety of those who care.
- Bring things indoors. Lawn furniture, trash cans, children's toys, garden equipment, clotheslines, hanging plants, and any other objects that may be blown around or swept away should be brought indoors.
- Look for potential hazards. Look for coconuts, unripened fruit, and other objects in trees around your property that could blow or break off and fly around in strong winds. Cut them off and store them indoors until the storm is over. If you have not already cut away dead or diseased branches or limbs from trees and shrubs, leave them alone. Local rubbish collection services will not have time before the storm to pick anything up.
- Turn off electricity at the main fuse or breaker, and turn off water at the main valve. Unless local officials advise otherwise, leave natural gas on because you will need it for heating and cooking when

you return home. If you turn gas off, a licensed professional is required to turn it back on, and it may take weeks for a professional to respond.

- Turn off propane gas service. Propane tanks often become damaged or dislodged in disasters.
- If strong winds are expected, cover the outside of all the windows of your home. Use shutters that are rated to provide significant protection from windblown debris, or pre-fit plywood coverings over all windows.
- If flooding is expected, consider using sand bags to keep water away from your home. It takes two people about one hour to fill and place 100 sandbags, giving you a wall one foot high and 20 feet long. Make sure you have enough sand, burlap, or plastic bags, shovels, strong helpers, and time to place them properly.

After a Disaster

- Remain calm and patient. Staying calm and rational will help you move safely and avoid delays or accidents caused by irrational behavior. Many people will be trying to accomplish the same things you are for their family's safety. Patience will help everyone get through a difficult situation more easily.
- Put your plan into action. Having specific steps to take will keep you working toward your family's safety.
- Listen to local radio or television for news and instructions. Local authorities will provide the most appropriate advice for your particular situation.
- Check for injuries. Give first aid and get help for seriously injured people. Taking care of yourself first will allow you to help others safely until emergency responders arrive.
- Help your neighbors who may require special assistance — infants, elderly people, and people with disabilities — and the people who care for them or for large families who may need additional help in an emergency situation.
- Wear protective clothing and sturdy shoes. Disaster areas and debris contain many hazards. The most common injury following disasters is cut feet.
- Check for damage in your home. Disasters can cause extensive damage, sometimes in places you least expect. Look carefully for any potential hazards.

- Use battery-powered lanterns or flashlights when examining buildings. Battery-powered lighting is the safest and easiest and does not present a fire hazard for the user, occupants, or building.
- Avoid using candles. Candles can easily cause fires. They are quiet and easily forgotten. They can tip over during earthquake after-shocks or in a gust of wind. Candles invite fire play by children. More than three times as many people have died in residential fires caused by using candles after a disaster than from the direct impact of the disaster itself.
- Look for fire hazards. There may be broken or leaking gas lines, flooded electrical circuits, or submerged furnaces or electrical appliances. Fire is the most frequent hazard following floods.
- Check for gas leaks. Sniff for gas leaks, starting at the water heater. If you smell gas or suspect a leak, open a window and get everyone outside quickly. Turn off the gas at the outside main valve if you can and call the gas company from a neighbor's home. If you turn off the gas for any reason, it must be turned back on by a professional.
- Look for electrical system damage. If you see sparks or broken or frayed wires, or if you smell burning insulation, turn off the electricity at the main fuse box or circuit breaker. If you have to step in water to get to the fuse box or circuit breaker, call an electrician first for advice. Electrical equipment should be checked and dried before being returned to service.
- Check for sewage and water lines damage. If you suspect sewage lines are damaged, avoid using the toilets and call a plumber. If water pipes are damaged, contact the water company and avoid using water from the tap. You can obtain safe water from undamaged water heaters or by melting ice cubes.
- Clean up spills immediately. This includes medicines, bleach, gasoline, and other flammable liquids.
- Watch for loose plaster and ceilings that could fall.
- Take pictures of the damage, both of the building and its contents, for insurance claims.

- Confine or secure your pets. They may be frightened and try to run.
- Let your family contact know you have returned home and then do not use the telephone again unless it is a life-threatening emergency. Telephone lines are frequently overwhelmed in disaster situations. They need to be clear for emergency calls to get through.
- Make sure you have an adequate water supply in case service is cut off. Water is often contaminated after major disasters. An

undamaged water heater may be your best source of drinking water.

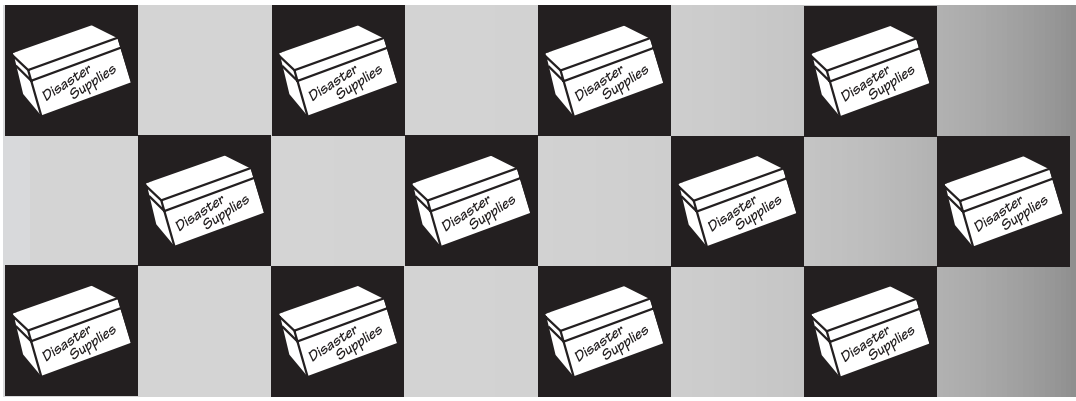
- Stay away from downed power lines and report them immediately. Getting damaged utilities turned off will prevent further injury or damage. If possible, set out a flare and stay on the scene to warn others until authorities arrive.

For People With Disabilities

Persons with disabilities, or those who may have mobility problems (such as elderly persons), should prepare as anyone else. In addition, they may want to consider some of the following steps:

- Create a network of relatives, friends, or co-workers to assist in an emergency. If you think you may need assistance in a disaster, discuss your disability with relatives, friends, or co-workers and ask for their help. For example, if you need help moving or require special arrangements to receive emergency messages, make a plan with friends. Make sure they know where you keep your disaster supplies. Give a key to a neighbor or friend who may be able to assist you in a disaster.
- Maintain a list of important items and store it with your emergency supplies. Give a copy to another family member and a friend or neighbor. Important items might include:
  - Special equipment and supplies, for example, hearing aid batteries.
  - Current prescription names and dosages.
  - Names, addresses, and telephone numbers of doctors and pharmacists.
  - Detailed information about the specifications of your medication regime.
- Contact your local emergency management office now. Many local emergency management offices maintain registers of people with disabilities and their needs so they can be located and assisted quickly in a disaster.
- Wear medical alert tags or bracelets to identify your disability in case of an emergency. These may save your life if you are in need of medical attention and unable to communicate.
- Know the location and availability of more than one facility if you are dependent on a dialysis machine or other life-sustaining equipment or treatment. There may be several people requiring equipment, or facilities may have been affected by the disaster.

- If you have a severe speech, language, or hearing disability:
  - When you dial 9-1-1, tap the space bar to indicate a TDD call.
  - Store a writing pad and pencils to communicate with others.
  - Keep a flashlight handy to signal your whereabouts to other people and for illumination to aid in communication.
  - Remind friends that you cannot completely hear warnings or emergency instructions. Ask them to be your source of emergency information as it comes over the radio. Another option is to use a NOAA Weather Radio with a tone-alert feature connected to lights. When a watch or warning is issued for your area, the light would alert you to potential danger.
  - If you have a hearing ear dog, be aware that the dog may become confused or disoriented in an emergency.
  - If you have a hearing ear dog, store extra food, water, and supplies for your dog. Trained hearing ear dogs will be allowed to stay in emergency shelters with their owners. Check with local emergency management officials for more information.
- If you are blind or visually impaired:
  - Keep extra canes well placed around the home and office, even if you use a guide dog.
  - If you have a guide dog, be aware that the dog may become confused or disoriented in an emergency.
  - If you have a guide dog, store extra food, water, and supplies for your dog. Trained guide dogs will be allowed to stay in emergency shelters with their owners. Check with local emergency management officials for more information.
- If you need a wheelchair, show friends how to operate your wheelchair so they can move you if necessary. Make sure friends know the size of your wheelchair in case it has to be transported, and where to get a battery if needed.
- Listen to the advice of local officials. People with disabilities have the same choices as other community residents about whether to evacuate their homes and where to go when an emergency threatens. Decide whether it is better to leave the area, stay with a friend, or go to a public shelter. Each of these decisions requires planning and preparation.



Disaster Supplies Kit

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/ CSREES, and USGS

Why talk about a Disaster Supplies Kit?

After a disaster, local officials and relief workers will be on the scene, but they cannot reach everyone immediately. You could get help in hours, or it may take days. Basic services, such as electricity, gas, water, and telephones, may be cut off, or you may have to evacuate at a moment's notice. You probably won't have time to shop or search for the supplies you'll need. Your family will cope best by preparing for disaster before it strikes.

Local officials and relief workers will be on the scene, but they cannot reach everyone immediately. You could get help in hours, or it may take days...you probably won't have time to shop or search for the supplies you'll need.

What is a Disaster Supplies Kit?

Assembling the supplies you might need following a disaster is an important part of your Family Disaster Plan. Following a disaster, having extra supplies at home or supplies to take with you in the event of an evacuation can help your family endure evacuation or home confinement. Learn more about Disaster Supplies Kits by contacting your local emergency management agency or American Red Cross chapter.

Awareness Information

Involve children in disaster preparedness.

Ask children to help you remember to keep your kits in working order by changing the food and water every six months and replacing batteries as necessary. Children might make calendars or posters with the appropriate dates marked on them. Ask children to think of items that they would like to include in their own Disaster Supplies Kit, such as books or games or appropriate nonperishable food items.

Prepare Your Kit

Tips for Your Disaster Supplies Kit

- Keep a smaller Disaster Supplies Kit in the trunk of each car. If you become stranded or are not able to return home, having some items will help you to be more comfortable until help arrives.
- Keep items in airtight plastic bags. This will help protect them from damage or spoiling.
- Replace stored food and water every six months. Replacing your food and water supplies will help ensure their freshness.
- Rethink your kit and family needs at least once a year. Replace batteries, update clothes, etc.
- Ask your physician or pharmacist about storing prescription medications. It may be difficult to obtain prescription medications during a disaster because stores may be closed or supplies may be limited.
- Use an easy-to-carry container for the supplies you would most likely need for an evacuation. Label it clearly. Possible containers include:
  - A large, covered trash container.
  - A camping backpack.
  - A duffel bag.
  - A cargo container that will fit on the roof of your vehicle.

Disaster Supplies Kit Basics

The following items might be needed at home or for an evacuation. Keeping them in an easy-to-carry backpack or duffel bag near your door would be best in case you need to evacuate quickly, such as in a tsunami, flash flood, or major chemical emergency. Store your kit in a convenient place known to all family members. Kit basics are:

- A portable, battery-powered radio or television and extra batteries.
- Flashlight and extra batteries.
- First aid kit and first aid manual.
- Supply of prescription medications.
- Credit card and cash.
- Personal identification.
- An extra set of car keys.
- Matches in a waterproof container.
- Signal flare.

- Map of the area and phone numbers of places you could go.
- Special needs, for example, diapers or formula, prescription medicines and copies of prescriptions, hearing aid batteries, spare wheelchair battery, spare eyeglasses, or other physical needs.

If you have additional space, consider adding some of the items from your Evacuation Supplies Kit.

Evacuation Supplies Kit

Place in an easy-to-carry container the supplies you would most likely need if you were to be away from home for several days. Label the container clearly. Remember to include:

- Disaster Supplies Kit basics (listed above).
- Three gallons of water per person.
- Three-day supply of nonperishable food.
- Kitchen accessories: manual can opener; mess kits or paper cups, plates, and plastic/disposable utensils; utility knife; a can of cooking fuel if food must be cooked; household liquid bleach to treat drinking water; sugar, salt, pepper; aluminum foil; plastic resealable bags.
- One complete change of clothing and footwear for each family member, sturdy shoes or workboots, raingear, hat and gloves, thermal underwear, sunglasses.
- Blankets or sleeping bag for each family member.
- Tools and other accessories: paper, pencil; needles and thread; pliers, shut-off wrench, shovels, and other useful tools; tape; medicine dropper; whistle; plastic sheeting; small canister, A-B-C-type fire extinguisher; emergency preparedness manual; tube tent; compass.

To Build a Makeshift Toilet

Line a bucket with a garbage bag and make a toilet seat out of two boards placed parallel to each other across the bucket. After each use, pour a disinfectant such as bleach (1 part liquid chlorine bleach to 10 parts water) into the garbage bag. This will help avoid infection and stop the spread of disease. Cover the bucket tightly when it is not in use.

Bury garbage and human waste to avoid the spread of disease by rats and insects. Dig a pit two to three feet deep and at least 50 feet downhill or away from any well, spring, or water supply.

- Sanitation and hygiene items: toilet paper, towelettes; soap, hand sanitizer, liquid detergent; feminine supplies; personal items such as shampoo, deodorant, toothpaste, toothbrushes, comb and brush, lip balm; plastic garbage bags (heavy-duty) and ties (for personal sanitation uses); medium-sized plastic bucket with tight lid; disinfectant; household chlorine bleach; small shovel for digging an expedient latrine.
- Entertainment, such as games and books.
- Remember to consider the needs of very young and older family members, such as

infants and elderly or disabled persons.

- For baby: formula, diapers, bottles, powdered milk, medications.
- For adults: heart and high blood pressure medication, insulin, prescription drugs, denture needs, contact lenses and supplies, extra eyeglasses, and hearing aid batteries.

Home Disaster Supplies Kit

In addition to your Disaster Supplies Kit basics and Evacuation Supplies Kit, gathering the following items will help your family endure home confinement, which often happens following disasters and may include the loss of utilities.

- Wrench to turn off household gas and water. Keep it near the shut-off valves.
- A week's supply of food and water.
- Additional blankets and sleeping bags.

Also, consider using a NOAA Weather Radio with the tone-alert feature in your home. NOAA Weather Radio is the best means for receiving warnings from the National Weather Service. The National Weather Service continuously broadcasts updated weather warnings and forecasts that can be received by NOAA Weather Radios sold in many stores. NOAA Weather Radio now broadcasts warning and postevent information for all types of hazards — both natural (such as earthquakes and volcanic activity) and technological (such as chemical releases or oil spills). Working with other federal agencies and the Federal Communications Commission's new Emergency Alert System, NOAA Weather Radio is an "all hazards" radio network, making it the single source for the most comprehensive weather and emergency information available to the public. Your National Weather Service recommends purchasing a radio that has both a battery backup and a Specific Area Message Encoder (SAME) feature, which automatically alerts you when a watch or warning is issued for your county, giving you immediate information about a life-threatening situation. The average range is 40 miles, depending on topography; the National Weather Radio signal is a line-of-sight signal, which does not bore through hills or mountains.

Water

Having an ample supply of clean water is a top priority in an emergency.

- Store water in plastic containers, such as soft drink plastic bottles. Seal containers tightly, label them and store in a cool, dark place. Replace water every six months. Avoid using containers that will decompose or break, such as milk cartons or glass bottles.

- Keep at least a three-day supply of water, or a minimum of three gallons per person. It is strongly recommended to have more if possible. Use one-half gallon per day for drinking, and one-half gallon for cooking and sanitation. A normally active person needs to drink at least two quarts of water each day. Hot environments and intense physical activity can double that amount. Children, nursing mothers, and ill people will need more. Store your three-day supply in a handy place. You need to have water packed and ready in case there is no time to fill water bottles when disaster strikes.
- Water needs to be treated only if it is of questionable purity.
  - Boiling is the safest method of treating water. Strain water through a clean cloth to remove bulk impurities. Bring water to a rolling boil for about one full minute, keeping in mind that some water will evaporate. Let the water cool before drinking. Boiled water will taste better if you put oxygen back into it by pouring the water back and forth between two clean containers. This will also improve the taste of stored water.
  - You can use household liquid bleach to kill microorganisms. Use only regular household liquid bleach that contains 5.25 percent sodium hypochlorite. Do not use scented bleaches, color-safe bleaches, or bleaches with added cleaners. Add 16 drops of bleach per gallon of water, stir, and let stand for 30 minutes. If the water does not have a slight bleach odor, repeat the dosage and let stand another 15 minutes. If it still does not smell of chlorine, discard it and find another source of water. Other chemicals, such as iodine or water treatment products sold in camping or surplus stores that do not contain 5.25 percent hypochlorite as the only active ingredient, are not recommended and should not be used.
  - Distillation involves boiling water and then collecting the vapor that condenses back to water. The condensed vapor will not include salt or other solid impurities. To distill, fill a pot halfway with water. Tie a cup to the handle on the pot's lid so that the cup will hang rightside up when the lid is upside down (make sure the cup is not touching the water) and boil the water for 20 minutes. The water that drips from the lid into the cup is distilled.
- Melt ice cubes or use water from undamaged hot water tanks, toilet tanks (not the bowl), and water pipes if you need additional water.
- If you need to find water outside of your home, you can use rainwater; streams, rivers, and other moving bodies of water; ponds and lakes; and natural springs. If you question its purity,

be sure to treat the water first. Avoid water with floating material, an odor, or a dark color. Use saltwater only if you distill it first. Do NOT drink flood water.

Food

Even though it is unlikely that an emergency would cut off your food supply for two weeks, you should consider preparing a supply that will last that long. The easiest way to develop a two-week stockpile is to increase the amount of basic foods you normally keep on your shelves. If your water supply is limited, try to avoid foods that are high in fat and protein, and don't stock salty foods, since they will make you thirsty. Familiar foods can lift morale and give a feeling of security in time of stress. Also, canned foods won't require cooking, water, or special preparation. Take into account your family's unique needs and tastes. Try to include foods that they will enjoy and that are also high in calories, protein, carbohydrates, vitamins, and minerals.

- Pack at least a three-day supply of nonperishable food and water, and store it in a handy place. You need to have these items packed and ready in case there is no time to gather food from the kitchen when disaster strikes.
- Select foods that require no refrigeration, preparation, or cooking, and little or no water. Foods that are compact and lightweight are easy to store and carry.
- If you must heat food, pack a can of cooking fuel.
- Try to eat salt-free crackers, whole grain cereals, and canned food with high liquid content. Recommended foods include:
  - Ready-to-eat canned meats, fruits, and vegetables.
  - Canned juice, milk, and soup (if powdered, store extra water).
  - High-energy foods, such as peanut butter, jelly, crackers, granola bars, and trail mix.
  - Comfort foods, such as hard candy, sweetened cereals, candy bars, and cookies.
  - Instant coffee, tea bags.
  - Foods for infants, elderly persons, or persons on special diets, if necessary.

  Also consider:

  - Compressed food bars. They store well, are lightweight, taste good, and are nutritious.
  - Trail mix. Available prepackaged, or assemble your own.

- Dried foods. They can be nutritious and satisfying, but contain a lot of salt, which promotes thirst.
- Freeze-dried foods. They are tasty and lightweight, but will need water for reconstitution.
- Instant meals. Cups of noodles or cups of soup are a good addition, although they need water for reconstitution.
- Snack-sized canned goods. Good because they generally have pull-top lids or twist-open keys.
- Prepackaged beverages. Those in foil packets and foil-lined boxes are suitable because they are tightly sealed and will keep for a long time.

Food options to avoid:

- Commercially dehydrated foods. They can require a great deal of water for reconstitution and extra effort in preparation.
- Bottled foods. They are generally too heavy and bulky, and break easily.
- Meal-sized canned foods. They are usually bulky and heavy.
- Whole grains, beans, pasta. Preparation could be complicated under the circumstances of a disaster.

- If your electricity goes off:
  - First, use perishable food and foods from the refrigerator.
  - Then, use the foods from the freezer. To minimize the number of times you open the freezer door, post a list of freezer contents on it. In a well-filled, well-insulated freezer, foods will usually still have ice crystals in their centers (meaning foods are safe to eat) for at least three days.
  - Finally, begin to use nonperishable foods and staples.
- Remember to store nonperishable foods for your pets.

First Aid Kit

Assemble a first aid kit for your Disaster Supplies Kit and one for each car.

- The basics for your first aid kit include:
  - First aid manual.
  - Sterile adhesive bandages in assorted sizes.
  - Assorted sizes of safety pins.
  - Cleansing agent/soap.

- Latex gloves (2 pairs).
- Sunscreen.
- 2-inch sterile gauze pads (4–6).
- 4-inch sterile gauze pads (4–6).
- Triangular bandages (3).
- Nonprescription drugs.
- 2-inch sterile roller bandages (3 rolls).
- 3-inch sterile roller bandages (3 rolls).
- Scissors.
- Tweezers.
- Needle.
- Moistened towelettes.
- Antiseptic.
- Thermometer.
- Tongue depressor blades (2).
- Tube of petroleum jelly or other lubricant.

• Have the following nonprescription drugs in your Disaster Supplies Kit:

- Aspirin or nonaspirin pain reliever.
- Antidiarrhea medication.
- Antacid (for stomach upset).
- Syrup of ipecac (use to induce vomiting if advised by the poison control center).
- Laxative.
- Activated charcoal (use if advised by the poison control center).
- Vitamins.

• Add any necessary prescription and nonprescription drugs.

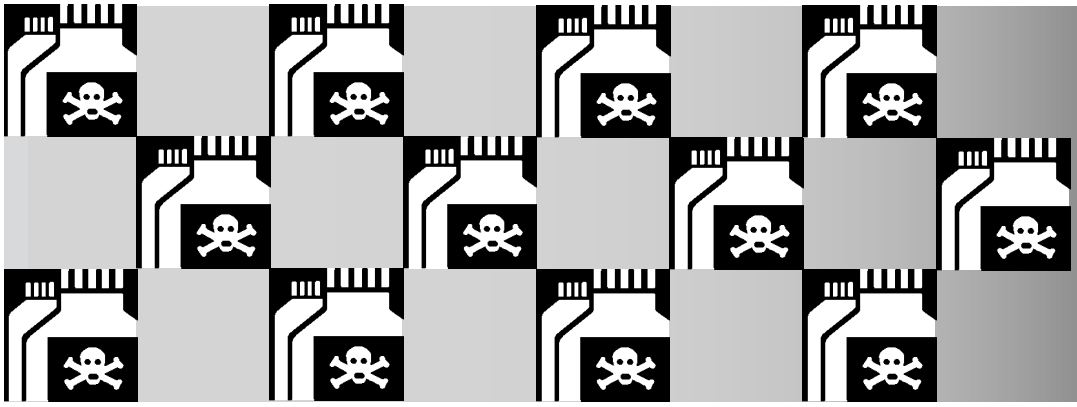
• Add special needs for infants, elderly persons, or anyone with serious allergies.

Important Documents

• Keep the following original documents in a safe deposit box if possible, and copies in a waterproof, fire-resistant portable container:

- Will, insurance policies, contracts, deeds, stocks and bonds.

- Passports, social security cards, immunization records.
- Bank account numbers.
- Credit card account numbers and companies.
- Inventory of valuable household goods, important telephone numbers.
- Family records (birth, marriage, death certificates).



Chemical Emergency

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/ CSREES, and USGS

Why talk about chemical emergencies?

Hazardous materials are chemical substances, which if released or misused, can pose a threat to the environment. These chemicals are used in industry, agriculture, medicine, research, and consumer goods. As many as 500,000 products pose physical or health hazards and can be defined as "hazardous chemicals." Each year, over 1,000 new synthetic chemicals are introduced. Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. These substances are most often released as a result of transportation accidents or because of chemical accidents in manufacturing plants.

What is a home chemical emergency, and a major chemical emergency?

Chemicals are a natural and important part of our environment. Even though we often don't think about it, we use chemicals every day. They can be found in our kitchens, medicine cabinets, basements, and garages. Chemicals help us keep our food fresh and our bodies clean. They help our plants grow and fuel our cars. And chemicals make it possible for us to live longer, healthier lives.

Hazardous materials are most often released as a result of transportation accidents or because of chemical accidents in manufacturing plants.

A home chemical emergency arises when chemicals are used improperly. Some chemicals that are safe, and even helpful in small amounts, can be harmful in larger quantities or under certain conditions. In fact, most chemical accidents occur in our own homes, and they can be prevented.

A major chemical emergency is an accident that releases a hazardous amount of a chemical into the environment. Accidents can happen underground, on railroad tracks or highways, and at manufacturing plants. These accidents sometimes result in a fire or explosion, but many times

you cannot see or smell anything unusual.

In the event of a major chemical emergency, you will be notified by the authorities. To get your attention, a siren could sound, you may be called by telephone, or emergency personnel may drive by and give instructions over a loudspeaker. Officials might even come to your door.

Learn more about your risk of chemical emergencies by contacting your local poison control center, local authorities on hazardous materials, the Environmental Protection Agency, your local emergency manager, or local American Red Cross chapter.

Awareness Information

You may be exposed to a chemical even though you may not be able to see or smell anything unusual. You may be exposed in three ways:

1. Breathing the chemical.
2. Swallowing contaminated food, water, or medication.
3. Touching the chemical, or coming into contact with clothing or things that have touched the chemical.

Learn about chemicals and chemical emergencies:

- Chemicals are everywhere. They are an important part of life.
- The most common chemical accidents occur in our own homes, and they can be prevented.
- The best way to avoid chemical accidents is to read and follow the directions for use, storage, and disposal of the product. Mixing products can be hazardous.

If you find someone who appears to have been injured from chemical exposure, make sure you are not in danger before administering first aid. If you think there might be potential danger, call 9-1-1 or your local emergency number. If there is no danger, give first aid as needed.

The best way to protect yourself and your family is to be prepared. Knowing what to watch for and how to respond will keep you alert to potential chemical hazards.

Preventing Chemical Emergencies in the Home

- Learn about household chemical risk. Contact authorities on hazardous household materials, such as the Environmental Protection Agency, for information about potentially dangerous household products and their antidotes. Ask about the advisability of maintaining antidotes in your home for cleaners and germicides, deodorizers, detergents,

drain and bowl cleaners, gases, home medications, laundry bleaches, liquid fuels, and paint removers and thinners.

- Keep all medicines, cosmetics, cleaning products, and other household chemicals out of sight and out of reach of children. The most common home chemical emergencies involve small children eating medicines. Experts in the field of chemical manufacturing suggest that moving hazardous materials out of sight could eliminate up to 75 percent of all poisonings of small children.
- Flush medicines that are no longer being used or that are outdated down the toilet, and place the empty container in the trash. Outdated medicines can sometimes cause ill effects. Flushing them will eliminate the risk of people or animals picking them out of garbage.
- Store household chemicals according to the instructions on the label. Non-food products should be stored tightly closed in their original container so you can always identify the contents of each container and how to properly use the product.
- Avoid mixing common household chemical products. Some combinations of these products, such as ammonia and chlorine bleach, can create toxic gases.
- Always read the directions before using a new product. To avoid inhaling dangerous vapors, do not use some products in a small, confined space. Other products should not be used without gloves and eye protection to help prevent the chemical from touching your body.
- Read instructions on how to dispose of chemicals properly. Improper disposal can result in harm to yourself or members of your family, accidental contamination of the local water supply, or harm to other people. It is also important to dispose of products properly to preserve the environment and protect wildlife. Plus, some products can be recycled, which helps protect the environment. If you have questions about how to properly dispose of a chemical, call the facility or the environmental or recycling agency.
    - Small amounts of the following products can be safely poured down the drain with plenty of water: antifreeze, bathroom and glass cleaner, bleach, drain cleaner, fertilizer, household disinfectant, laundry and dishwashing detergent, rubbing alcohol, rug and upholstery cleaner, and toilet bowl cleaner.
    - Small amounts of the following products should be disposed of by wrapping the container in newspaper and plastic and placing it in the trash: brake fluid, car wax or polish, dish and laundry soap, drain cleaner, fertilizer, furniture and floor polish, insect repellent, nail polish, oven cleaner, paint thinners and strippers, pesticides,

power cleaners, toilet bowl cleaner, water-based paint, and wood preservatives.

  - Dispose of the following products at a recycling center or a collection site: kerosene, motor or fuel oil, car battery or battery acid, diesel fuel, transmission fluid, large amounts of paint, paint thinner or stripper, power steering fluid, turpentine, gun cleaning solvents, and tires.
  - Empty spray cans by pressing the button until nothing comes out, then place the can in the trash. Do not place spray cans into a burning barrel, incinerator, or trash compactor because they may explode.

- Never smoke while using household chemicals. Avoid using hair spray, cleaning solutions, paint products or pesticides near the open flame of an appliance, pilot light, lighted candle, fireplace, wood burning stove, etc. Although you may not be able to see or smell them, vapor particles in the air could catch fire or explode.
- If you should spill a chemical, clean it up immediately with rags, being careful to protect your eyes and skin. Allow the fumes in the rags to evaporate outdoors in a safe place, then dispose of them by wrapping them in a newspaper and placing them in a sealed plastic bag. Dispose of these materials with your trash.
- Buy only as much of a chemical as you think you will use. If you have product left over, try to give it to someone who will use it. Storing hazardous chemicals increases risk to chemical emergencies.
- Keep an A-B-C–rated fire extinguisher in the home and car, and get training from your local fire department on how to use them. Should chemicals ignite, you will have an opportunity to extinguish the fire before it spreads, avoiding greater damage.
- Post the number of the nearest poison control center by all telephones. In an emergency situation you may not have time to look up critical phone numbers.
- Learn to detect the presence of a hazardous material. Many hazardous materials do not have a taste or an odor. Some materials can be detected because they cause physical reactions such as watering eyes or nausea. Some hazardous materials exist beneath the surface of the ground and can be recognized by an oil or foam-like appearance. Recognizing them immediately will allow you to take steps to avoid direct contact and limit your exposure to potentially hazardous chemicals.

- Learn to recognize the symptoms of toxic poisoning:
  - Difficulty in breathing.
  - Irritation of the eyes, skin, throat, or respiratory tract.
  - Changes in skin color.
  - Headache or blurred vision.
  - Dizziness.
  - Clumsiness or lack of coordination.
  - Cramps or diarrhea.

What to Do During a Home Chemical Emergency

- If your child should eat or drink a non-food substance, find any containers immediately and take them to the phone. The poison control center may need specific information from the container to give you the best emergency advice.
- Call the poison control center, emergency medical services (EMS), 9-1-1, or the operator. They will give you emergency advice while you wait for professional help.
- Follow the emergency operator's or dispatcher's instructions carefully. Often the first aid advice found on containers may not be appropriate. Do not give anything by mouth until you have been advised by medical professionals.
- If a hazardous substance comes into contact with an eye, it is important to take immediate action. Delaying first aid can greatly increase the likelihood of injury. Flush the eye with clear, lukewarm water for a minimum of 15 minutes, unless authorities instruct you not to use water on the particular chemical involved. Continue the cleansing process even if the victim indicates he or she is no longer feeling any pain, then seek medical attention.
- If there is danger of a fire or explosion, get out of the house immediately. Do not waste time collecting items or calling the fire department when you are in danger.
- If there is a fire or explosion, call the fire department from outside (a cellular phone or a neighbor's phone). Once you are safely away from danger, call for professional help.
- Stay away from the house to avoid the possibility of breathing toxic fumes.
- Wash hands, arms, or other parts of the body that may have been exposed to the chemical. Chemicals may continue to irritate the skin until they are washed off.

- Discard any clothing that may have been contaminated. Some chemicals may not wash out completely. Discarding clothes will prevent potential future exposure.
- Administer first aid treatment to victims of chemical burns.
  - Call 9-1-1 for emergency help.
  - Remove clothing and jewelry from around the injury.
  - Pour clean, cool water over the burn for 15 to 30 minutes.
  - Loosely cover the burn with a sterile or clean dressing. Be sure that the dressing will not stick to the burn.
  - Refer victim to a medical professional for further treatment.

Plan for Major Chemical Emergencies

- Learn about your community's risk from major chemical emergencies. Contact your emergency management agency or American Red Cross chapter for information on chemical plants and hazardous material transportation routes in your area.
- Find out evacuation plans for your workplace and your children's schools. Different locations have different plans. Know where you or your children may be taken in the event of a major chemical emergency.
- Develop an evacuation plan. (See "Evacuation" in the "Family Disaster Plan" section.) Everyone in your family should know where to go if they have to leave. Trying to make plans at the last minute can be upsetting and create confusion.
- Learn about industry and community warning signals. Different communities may have different ways of providing warnings. Many communities have sirens intended for outdoor warning purposes. Use a NOAA weather radio with a tone-alert feature to keep you aware of warnings while you are indoors.

Assemble a Disaster Supplies Kit

Please see the "Disaster Supplies Kit" section for general supplies kit information. Specific supplies for a chemical emergency should include the following:

- Disaster Supply Kit basics.
- Evacuation Supply Kit.

Discuss chemical emergencies with your family. Everyone should know what to do in case all family members are not together. Discussing major chemical emergencies ahead of time helps reduce fear and anxiety and lets everyone know how to respond.

Media and Community Education Ideas

- Publish a special section in your local newspaper with emergency information on hazardous materials. Localize the information by printing the phone numbers of the local poison control center, emergency services

offices, the American Red Cross, and local hospitals.

- Interview a member of your community's Local Emergency Planning Committee about what hazardous substances may be in your community, where they are kept in large quantities, and by what routes they are transported through the area.
- Publish a chart of warning symbols and terms.
- Publish a series on hazardous materials that can be found in the home and the proper antidotes for them.
- Stage a demonstration to show people how to seal off their homes properly by working with emergency building materials, such as sandbags, plywood, and plastic sheeting.

What to Do During a Major Chemical Emergency

- If you hear a siren or other warning signal, turn on a radio or television for further emergency information. You will be notified of a major chemical emergency by the authorities. To get your attention, a siren could sound, you may be called by telephone, or emergency personnel may drive by and give instructions over a loudspeaker. Officials might even come to your door.
- Listen carefully to the radio or television. The Emergency Alert System (EAS), which has replaced the Emergency Broadcast System, may be activated. You will be given specific instructions for your particular situation.
- Strictly follow instructions. Your life could depend on it.
- You will be told the following:
  - The type of health hazard.
  - The area affected.
  - How to protect yourself.
  - Evacuation routes (if necessary).
  - Shelter locations.
  - Type and location of medical facilities.
  - The phone numbers to call if you need extra help.
- Call EMS, 9-1-1, or the operator only for a possible life-threatening emergency. Telephone lines are frequently overwhelmed in disaster situations. They need to be clear for emergency calls to get through.

What to Do if You Are at the Scene of a Chemical Accident

- Call 9-1-1 or the local fire department to report the nature and location of the accident as soon as possible. Alerting local authorities to a major chemical emergency immediately may help reduce potential injury or damage.
- Move away from the accident scene and help others away. Minimizing the time you are exposed reduces your risk of injury from breathing toxic chemicals. Some chemicals may ignite or explode.
- Stay away from the spilled substance and avoid touching it. If you are not sure of a substance or its effects, wait for authorities on the scene to advise you of proper medical care or attention to minimize injury.
- Try to avoid inhaling gases, fumes, or smoke. If possible, cover your mouth with a cloth while leaving the area. Many chemicals can damage breathing passages.
- Stay away from accident victims until the hazardous material has been identified. Once a substance has been identified and authorities indicate it is safe to go near victims, you can move victims to fresh air and call for emergency medical care. Remove contaminated clothing and shoes and place them in a plastic bag. Cleanse victims who have come in contact with chemicals by immediately pouring cold water over the skin or eyes with running water for at least 15 minutes, unless authorities instruct you not to use water on the particular chemical involved. Minimizing your exposure will decrease potential injury.
- Try to stay upstream, uphill, and upwind of the accident. Chemicals may be carried by water, gravity, or wind. Minimize your exposure.

How to Shelter-in-Place

One of the basic instructions you may be given in a chemical emergency is to shelter-in-place. This is a precaution aimed to keep you and your family safe while remaining in your home. If you are told to shelter-in-place, go inside, close all windows and vents and turn off all fans, heating or cooling systems. Take family members and pets to a safe room, seal windows and doors, and listen to local radio (or television) stations, or a NOAA Weather Radio for instructions.

- While gathering your family, you can provide a minimal amount of breathing protection by covering your mouth and nose with a damp cloth. Many chemicals can cause damage to breathing passages.

- Immediately after the shelter-in-place announcement is issued, fill up bathtubs or large containers for an additional water supply, and turn off the intake valve to the house. Water supplies may become contaminated. Preserve the water you have available.
- If gas or vapors could have entered the building, take shallow breaths through a cloth or a towel. Many chemicals can cause damage to breathing passages.
- Avoid eating or drinking any food or water that may be contaminated. Injury may occur from eating or drinking toxic chemicals.
- Seal house so contaminants cannot enter:
  - Close and lock all windows and doors in your home.
  - Turn off all fans, heating and air conditioning systems.
  - Close the fireplace damper.
  - Seal gaps and cracks under doorways and windows with wet towels and duct tape.
  - Seal gaps around window and air conditioning units, bathroom and kitchen exhaust fans, and stove and dryer vents with duct tape and plastic sheeting, wax paper, or aluminum wrap.
  - Close off nonessential rooms such as storage areas, laundry rooms, and extra bedrooms.
  - Turn off ventilation systems.
- Go to an above-ground room (not the basement) with the fewest windows and doors. Some chemicals are heavier than air, and may seep into basements, even if the windows are closed.
- Take your Disaster Supplies Kit with you. These items may make you more comfortable while you are waiting for further instructions.
- Stay in the room and listen to your radio or television until you are told all is safe, or you are told to evacuate. Local officials may call for evacuation in specific areas at greatest risk in your community. Following the advice of local authorities is your safest choice.
- If you are told there is danger of explosion, close the window shades, blinds, or curtains. To avoid injury, stay away from the windows. If windows break due to the explosion, the shades will help prevent glass from shattering into your home.

Evacuation During a Chemical Emergency

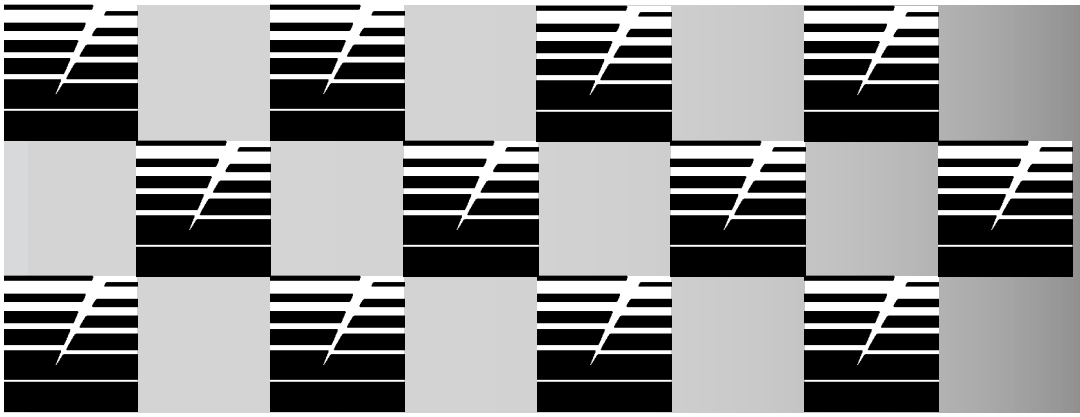
If you are told to evacuate immediately, take your Disaster Supplies Kit. Pack only the bare essentials, such as medications, and leave your home quickly. Follow the route authorities recommend. Don't take short-cuts on the way to the shelter, they may be blocked or expose you to dangerous chemicals.

- It is important to stay calm, listen carefully, and follow all instructions. Authorities will decide if evacuation is necessary, based primarily on the type and amount of chemical released and how long it is expected to affect an area. Other considerations are the length of time it should take to evacuate the area, weather conditions, and the time of day. Authorities will advise you of the safest steps to take for your particular situation.
- If an evacuation order is issued, listen to your radio to make sure the evacuation order applies to you, and to understand if you are to evacuate immediately or if you have time to pack some essentials. Stay tuned to a radio or television for information on evacuation routes, temporary shelters, and procedures. Following the advice of local authorities is your safest choice.
- Avoid using the telephone. Use your phone only in life-threatening emergencies, and then call the poison control center, EMS, 9-1-1, or the operator immediately. Telephone lines are frequently overwhelmed in disaster situations. They need to be clear for emergency calls to get through.
- If you are told to evacuate, do so immediately. Local officials may call for evacuation in specific areas at greatest risk in your community. Following the advice of local authorities is your safest protection.
- Take your Disaster Supplies Kit. These items may make you more comfortable while you are away from home.
- Only if you have time, seal your house so contaminants cannot enter:
  - Shut off all vents.
  - Close fireplace dampers.
  - You don't need to turn off your refrigerator or freezer, but you should turn off all other appliances and lights as you leave.
  - Close and lock your windows and doors.
- Move quickly and calmly. Leaving the area as quickly as possible will reduce your chance of exposure to hazardous materials. Staying calm and rational will help you move safely and avoid delays or accidents caused by irrational behavior.

- Do not assume that a shelter will have everything you need. While shelters provide a safe place to stay and food, specialty items for infants and individuals on restricted diets may not be available. In most major chemical emergencies, shelters will provide only emergency items such as meals, cots, and blankets.
- If you need a ride, ask a neighbor. If no neighbor is available to help you, listen to local radio or television stations for further instructions.
- Check on neighbors to make sure they have been notified, and offer help to those with disabilities or other special needs. Elderly people and people with disabilities may require additional assistance, and people who care for them or who have large families may need assistance in emergency situations.
- Take only one vehicle to the evacuation site. Traffic may be very heavy and parking at a shelter may be limited. Reduce further congestion and keep your family together by eliminating additional vehicles.
- Close your car windows and air vents, and turn off the heater or air conditioner. Many chemicals can cause damage to breathing passages.
- For your safety, follow the exact route you are told to take. Shortcuts may put you in the path of danger.

What to Do After a Major Chemical Emergency

- Return home only when authorities say it is safe. Local officials on the scene are the best source of information for your particular situation.
- Follow local instructions concerning the safety of food and water. Contaminated food or water can cause illness.
- Clean up and dispose of residue carefully. Follow instructions from emergency officials concerning cleanup methods. Local officials will best know proper procedures for your particular situation.



Earthquake

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/ CSREES, and USGS

Why talk about earthquakes?

Earthquakes strike suddenly, without warning. Earthquakes can occur at any time of the year and at any time of the day or night. On a yearly basis, 70 to 75 damaging earthquakes occur throughout the world. Estimates of losses from a future earthquake in the United States approach $200 billion.

There are 41 states and territories in the United States at moderate to high risk from earthquakes, and they are located in every region of the country. California experiences the most frequent damaging earthquakes; however, Alaska experiences the greatest number of large earthquakes — most located in uninhabited areas. The largest earthquakes felt in the United States were along the New Madrid Fault in Missouri, where a three-month long series of quakes from 1811 to 1812 included three quakes larger than a magnitude of 8 on the Richter Scale. These earthquakes were felt over the entire Eastern United States, with Missouri, Tennessee, Kentucky, Indiana, Illinois, Ohio, Alabama, Arkansas, and Mississippi experiencing the strongest ground shaking.

There are 41 states and territories in the United States at moderate to high risk from earthquakes, and they are located in every region of the country.

What are earthquakes, and what causes them?

An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that form the Earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free causing the ground to shake. Most earthquakes occur at the boundaries where the plates meet; however, some earthquakes occur in the middle of plates.

Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths and injuries and extensive property damage.

The Northridge, California, earthquake of January 17, 1994, struck a modern urban environment generally designed to withstand the forces of earthquakes. Its economic cost, nevertheless, has been estimated at $20 billion. Fortunately, relatively few lives were lost. Exactly one year later, Kobe, Japan, a densely populated community less prepared for earthquakes than Northridge, was devastated by the most costly earthquake ever to occur. Property losses were projected at $96 billion, and at least 5,378 people were killed. These two earthquakes tested building codes and construction practices, as well as emergency preparedness and response procedures.

Where earthquakes have occurred in the past, they will happen again. Learn whether earthquakes are a risk in your area by contacting your local emergency management office, American Red Cross chapter, state geological survey, or department of natural resources.

Awareness Information

Expect aftershocks. Aftershocks are smaller earthquakes that follow the main shock and can cause further damage to weakened buildings. Aftershocks can occur in the first hours, days, weeks, or even months after the quake. Be aware that some earthquakes are actually foreshocks, and a larger earthquake might occur.

Ground movement during an earthquake is seldom the direct cause of death or injury. Most earthquake-related injuries result from collapsing walls, flying glass, and falling objects as a result of the ground shaking, or people trying to move more than a few feet during the shaking. Much of the damage in earthquakes is predictable and preventable. We must all work together in our communities to apply our knowledge to building codes, retrofitting programs, hazard hunts, and neighborhood and family emergency plans.

Plan for an Earthquake

Develop a Family Disaster Plan. Please see the "Family Disaster Plan" section for general family planning information. Develop earthquake-specific planning. Learn about earthquake risk in your area. Contact your local emergency management office, American Red Cross chapter, state geological survey, or department of natural resources for historical information and earthquake preparedness for your area. Although there are

41 states or territories at moderate to high risk, many people do not realize the potential for earthquakes in their area.

If you are at risk from earthquakes:

- Pick "safe places" in each room of your home. A safe place could be under a sturdy table or desk or against an interior wall away from windows, bookcases, or tall furniture that could fall on you. The shorter the distance to move to safety, the less likely you will be injured. Injury statistics show that persons moving more than 10 feet during an earthquake's shaking are most likely to experience injury.
- Practice drop, cover, and hold-on in each safe place. Drop under a sturdy desk or table, hold on, and protect your eyes by pressing your face against your arm. Practicing will make these actions an automatic response. When an earthquake or other disaster occurs, many people hesitate, trying to remember what they are supposed to do. Responding quickly and automatically may help protect you from injury.
- Practice drop, cover, and hold-on at least twice a year. Frequent practice will help reinforce safe behavior.
- Talk with your insurance agent. Different areas have different requirements for earthquake protection. Study locations of active faults, and if you are at risk, consider purchasing earthquake insurance.
- Inform guests, babysitters, and caregivers of your plan. Everyone in your home should know what to do if an earthquake occurs. Assure yourself that others will respond properly even if you are not at home during the earthquake.
- Get training. Take a first aid class from your local Red Cross chapter. Get training on how to use a fire extinguisher from your local fire department. Keep your training current. Training will help you to keep calm and know what to do when an earthquake occurs.
- Discuss earthquakes with your family. Everyone should know what to do in case all family members are not together. Discussing earthquakes ahead of time helps reduce fear and anxiety and lets everyone know how to respond.

What to Tell Children

- Find safe places in every room of your home and your classroom. Look for safe places inside and outside of other buildings where you spend time. The shorter the distance you have to travel when the ground shakes, the safer you will be. Earthquakes can happen anytime and anywhere, so be prepared wherever you go.
- If you're indoors during an earthquake, drop, cover, and hold on. Get under a desk, table or bench. Hold on to one of the legs and

cover your eyes. If there's no table or desk nearby, sit down against an interior wall. An interior wall is less likely to collapse than a wall on the outside shell of the building. Pick a safe place where things will not fall on you, away from windows, bookcases, or tall, heavy furniture. It is dangerous to run outside when an earthquake happens because bricks, roofing, and other materials may fall from buildings during and immediately following earthquakes, injuring persons near the buildings.

- Wait in your safe place until the shaking stops, then check to see if you are hurt. You will be better able to help others if you take care of yourself first, then check the people around you. Move carefully and watch out for things that have fallen or broken, creating hazards. Be ready for additional earthquakes called "aftershocks."
- Be on the lookout for fires. Fire is the most common earthquake-related hazard, due to broken gas lines, damaged electrical lines or appliances, and previously contained fires or sparks being released.
- If you must leave a building after the shaking stops, use the stairs, not the elevator. Earthquakes can cause fire alarms and fire sprinklers to go off. You will not be certain whether there is a real threat of fire. As a precaution, use the stairs.
- If you're outside in an earthquake, stay outside. Move away from buildings, trees, streetlights, and power lines. Crouch down and cover your head. Many injuries occur within 10 feet of the entrance to buildings. Bricks, roofing, and other materials can fall from buildings, injuring persons nearby. Trees, streetlights, and power lines may also fall, causing damage or injury.

Assemble a Disaster Supplies Kit

Please see the section "Disaster Supplies Kit" for general supplies kit information. Earthquake-specific supplies should include the following:

- A flashlight and sturdy shoes by each person's bedside.
- Disaster Supplies Kit basics.
- Evacuation Supplies Kit.

How to Protect Your Property

- Bolt bookcases, china cabinets, and other tall furniture to wall studs. Brace or anchor high or top-heavy objects. During an earthquake, these items can fall over, causing damage or injury.
- Secure items that might fall (televisions, books, computers, etc.). Falling items can cause damage or injury.
- Install strong latches or bolts on cabinets. The contents of cabinets can shift during the shaking of an earthquake. Latches will prevent cabinets from flying open and contents from falling out.
- Move large or heavy objects and fragile items (glass or china) to lower shelves. There will be less damage and less chance of injury if these items are on lower shelves.

- Store breakable items such as bottled foods, glass, and china in low, closed cabinets with latches. Latches will help keep contents of cabinets inside.
- Store weed killers, pesticides, and flammable products securely in closed cabinets with latches, on bottom shelves. Chemical products will be less likely to create hazardous situations from lower, confined locations.
- Hang heavy items, such as pictures and mirrors, away from beds, couches, and anywhere people sit. Earthquakes can knock things off walls, causing damage or injury.
- Brace overhead light fixtures. During earthquakes, overhead light fixtures are the most common items to fall, causing damage or injury.
- Strap the water heater to wall studs. The water heater may be your best source of drinkable water following an earthquake. Protect it from damage and leaks.
- Bolt down any gas appliances. After an earthquake, broken gas lines frequently create fire hazards.
- Install flexible pipe fittings to avoid gas or water leaks. Flexible fittings will be less likely to break.
- Repair any deep cracks in ceilings or foundations. Get expert advice if there are signs of structural defects. Earthquakes can turn cracks into ruptures and make smaller problems bigger.
- Check to see if your house is bolted to its foundation. Homes bolted to their foundations are less likely to be severely damaged during earthquakes. Homes that are not bolted have been known to slide off their foundations, and many have been destroyed because they are uninhabitable.
- Consider having your building evaluated by a professional structural design engineer. Ask about home repair and strengthening tips for exterior features, such as porches, front and back decks, sliding glass doors, canopies, carports, and garage doors. Learn about additional ways you can protect your home. A professional can give you advice on how to reduce potential damage.
- Follow local seismic building standards and safe land use codes that regulate land use along fault lines. Some municipalities, counties, and states have enacted codes and standards to protect property and occupants. Learn about your area's codes before construction.

Media and Community Education Ideas

- Ask your community to develop stronger building codes. Building codes are the public's first line of defense against earthquakes. The codes

specify the levels of earthquake forces that structures must be designed to withstand. As ground motions of greater intensity have been recorded, the minimum earthquake requirements specified in building codes have been raised.

- Publish a special section in your local newspaper with emergency information on earthquakes. Localize the information by printing the phone numbers of local emergency services offices, the American Red Cross, and hospitals.
- Conduct a week-long newspaper series on locating hazards in the home.
- Work with local emergency services and American Red Cross officials to prepare special reports for people with mobility impairments about what to do during an earthquake.
- Provide tips on conducting earthquake drills in the home.
- Interview representatives of the gas, electric, and water companies about shutting off utilities.

What to Do During an Earthquake

- Drop, cover, and hold on! Move only a few steps to a nearby safe place. Most injured persons in earthquakes move more than five feet during the shaking. It is very dangerous to try to leave a building during an earthquake because objects can fall on you. Many fatalities occur when people run outside of buildings, only to be killed by falling debris from collapsing walls. In U.S. buildings, you are safer to stay where you are.
- If you are in bed, hold on and stay there, protecting your head with a pillow. You are less likely to be injured staying where you are. Broken glass on the floor has caused injury to those who have rolled to the floor or tried to get to doorways.
- If you are outdoors, find a clear spot away from buildings, trees, streetlights, and power lines. Drop to the ground and stay there until the shaking stops. Injuries can occur from falling trees, streetlights and power lines, or building debris.
- If you are in a vehicle, pull over to a clear location, stop and stay there with your seatbelt fastened until the shaking has stopped. Trees, power lines, poles, street signs, and other overhead items may fall during earthquakes. Stopping will help reduce your risk, and a hard-topped vehicle will help protect you from flying or falling objects. Once the shaking has stopped, proceed with caution. Avoid bridges or ramps that might have been damaged by the quake.

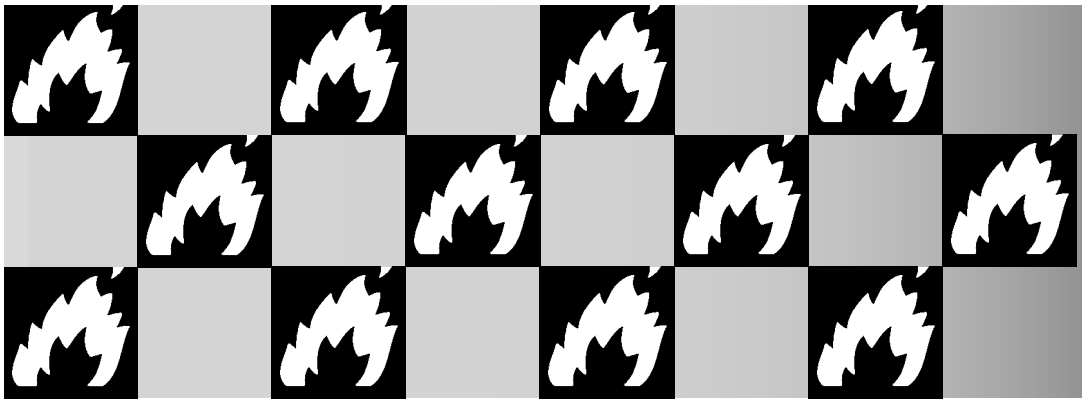
- Stay indoors until the shaking stops and you're sure it's safe to exit. More injuries happen when people move during the shaking of an earthquake. After the shaking has stopped, if you go outside, move quickly away from the building to prevent injury from falling debris.
- Stay away from windows. Windows can shatter with such force that you can be injured several feet away.
- In a high-rise building, expect the fire alarms and sprinklers to go off during a quake. Earthquakes frequently cause fire alarm and fire sprinkler systems to go off even if there is no fire. Check for and extinguish small fires, and, if exiting, use the stairs.
- If you are in a coastal area, move to higher ground. Tsunamis are often created by earthquakes. (See the "Tsunami" section for more information).
- If you are in a mountainous area or near unstable slopes or cliffs, be alert for falling rocks and other debris that could be loosened by the earthquake. Landslides commonly happen after earthquakes. (See the "Landslide" section for more information.)

What to Do After an Earthquake

- Check yourself for injuries. Often people tend to others without checking their own injuries. You will be better able to care for others if you are not injured or if you have received first aid for your injuries.
- Protect yourself from further danger by putting on long pants, a long-sleeved shirt, sturdy shoes, and work gloves. This will protect your from further injury by broken objects.
- After you have taken care of yourself, help injured or trapped persons. If you have it in your area, call 9-1-1, then give first aid when appropriate. Don't try to move seriously injured people unless they are in immediate danger of further injury.
- Look for and extinguish small fires. Eliminate fire hazards. Putting out small fires quickly, using available resources, will prevent them from spreading. Fire is the most common hazard following earthquakes. Fires followed the San Francisco earthquake of 1906 for three days, creating more damage than the earthquake.
- Leave the gas on at the main valve, unless you smell gas or think it's leaking. It may be weeks or months before professionals can turn gas back on using the correct procedures. Explosions have caused injury and death when homeowners have improperly turned their gas back on by themselves.

- Clean up spilled medicines, bleaches, gasoline, or other flammable liquids immediately. Avoid the hazard of a chemical emergency.
- Open closet and cabinet doors cautiously. Contents may have shifted during the shaking of an earthquake and could fall, creating further damage or injury.
- Inspect your home for damage. Get everyone out if your home is unsafe. Aftershocks following earthquakes can cause further damage to unstable buildings. If your home has experienced damage, get out before aftershocks happen.
- Help neighbors who may require special assistance. Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance in emergency situations.
- Listen to a portable, battery-operated radio (or television) for updated emergency information and instructions. If the electricity is out, this may be your main source of information. Local radio and local officials provide the most appropriate advice for your particular situation.
- Expect aftershocks. Each time you feel one, drop, cover, and hold on! Aftershocks frequently occur minutes, days, weeks, and even months following an earthquake.
- Watch out for fallen power lines or broken gas lines, and stay out of damaged areas. Hazards caused by earthquakes are often difficult to see, and you could be easily injured.
- Stay out of damaged buildings. If you are away from home, return only when authorities say it is safe. Damaged buildings may be destroyed by aftershocks following the main quake.
- Use battery-powered lanterns or flashlights to inspect your home. Kerosene lanterns, torches, candles, and matches may tip over or ignite flammables inside.
- Inspect the entire length of chimneys carefully for damage. Unnoticed damage could lead to fire or injury from falling debris during an aftershock. Cracks in chimneys can be the cause of a fire years later.
- Take pictures of the damage, both to the house and its contents, for insurance claims.
- Avoid smoking inside buildings. Smoking in confined areas can cause fires.
- When entering buildings, use extreme caution. Building damage may have occurred where you least expect it. Carefully watch every step you take.

  - Examine walls, floor, doors, staircases, and windows to make sure that the building is not in danger of collapsing.
  - Check for gas leaks. If you smell gas or hear a blowing or hissing noise, open a window and quickly leave the building. Turn off the gas, using the outside main valve if you can, and call the gas company from a neighbor's home. If you turn off the gas for any reason, it must be turned back on by a professional.
  - Look for electrical system damage. If you see sparks or broken or frayed wires, or if you smell burning insulation, turn off the electricity at the main fuse box or circuit breaker. If you have to step in water to get to the fuse box or circuit breaker, call an electrician first for advice.
  - Check for sewage and water line damage. If you suspect sewage lines are damaged, avoid using the toilets and call a plumber. If water pipes are damaged, contact the water company and avoid using water from the tap. You can obtain safe water from undamaged water heaters or by melting ice cubes.
  - Watch for loose plaster, drywall, and ceilings that could fall.
- Use the telephone only to report life-threatening emergencies. Telephone lines are frequently overwhelmed in disaster situations. They need to be clear for emergency calls to get through.
- Watch animals closely. Leash dogs and place them in a fenced yard. The behavior of pets may change dramatically after an earthquake. Normally quiet and friendly cats and dogs may become aggressive or defensive.



Fire

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/ CSREES, and USGS

Why talk about home fires?

Home fire is the disaster that children are most likely to experience. It is the fifth leading unintentional cause of injury and death in the United States, behind motor vehicle crashes, falls, poisoning by solids or liquids, and drowning. It also ranks as the first cause of death for children under the age of 15 at home. Roughly 80 percent of all fire deaths occur where people sleep, such as in homes, dormitories, barracks, or hotels. The majority of fatal fires occur when people are likely to be less alert, such as nighttime sleeping hours. Nearly all home and other building fires are preventable, even arson fires. The majority of arson fires are caused by juveniles, who often respond to counseling, and the rest can be deterred in a number of ways. No fire is inevitable.

Fire is the fifth leading unintentional cause of injury and death in the United States...it also ranks as the first cause of death for children under the age of 15 at home.

In 1995, 3,640 people died in reported home fires in the United States — roughly 10 people per day. In addition, thousands of people were injured in home fires, many hospitalized for severe burns; some disfigured for life. Victims are disproportionately children or elderly. Two of every five fires that kill young children are started by children playing with fire. Approximately 900 older adults die in fires annually.

Learn more about fire safety by contacting your local fire department, emergency management office, or American Red Cross chapter.

Awareness Information

The leading cause of death in a fire is asphyxiation, by a three-to-one ratio over burns. Fire consumes the oxygen in the air, while increasing the concentration of deadly carbon monoxide and other toxic gases in the atmosphere. Inhaling carbon monoxide can cause loss of consciousness or death within minutes.

The heat from a hostile fire exceeds anything to which a person is normally exposed. A fully developed room fire has temperatures over 1,100 degrees Fahrenheit.

Fire generates a black, impenetrable smoke that blocks vision and stings the eyes. It is impossible to navigate through such smoke, so fire drill participants should practice evacuating buildings by at least two routes.

Prepare for a Fire

Develop a Family Disaster Plan. Please see the "Family Disaster Plan" section for general family planning information. Home fire–specific planning should include the following:

- If smoke alarms are not already in place, install them outside each sleeping area and on each additional level of your home in accordance with local codes. Smoke alarms cut your chances of dying in a home fire nearly in half. Smoke alarms sense abnormal amounts of smoke or invisible combustion gases in the air. They can detect both smoldering and flaming fires. The *National Fire Alarm Code*®(NFPA 72) now requires hard-wired smoke alarms in new homes.
- Draw a floor plan of your home; mark two fire escape routes for each room. In thick, heavy, dark smoke it is easy to become disoriented. Creating a floor plan with two routes greatly helps everyone understand the safest routes during a frightening emergency.
- Consider escape ladders for sleeping areas on the second or third floor. Learn how to use them, and store them near the window. If main escape routes via stairs are blocked by smoke or fire, the windows may be your only alternative. Escape ladders permit quick exits, reducing time spent in smoke-filled, toxic environments while waiting for firefighters.
- Burglar bars and locks that block outside window entry must be easy to open from the inside. If a key is required to open bars or locks, keep a key near each window to use for fire escape. Quick-release devices are available for security bars. If smoke or fire is blocking the main exit, you must be able to use your alternate routes quickly. Fire deaths have occurred when people were trapped by security bars and were unable to get out and firefighters were unable to get in.
- Select a safe outside meeting place for everyone to meet after escaping from a fire. Make sure it will be a safe distance from heat, smoke, and flames. Family members may use different escape routes, exiting on different sides of the home. Gathering in a specific meeting place in front of the home will quickly let you know who is out, and allow you to advise firefighters of who may need help and their probable location inside.

- Conduct a home fire drill at least twice a year with all members of your household. Fires produce thick, dark smoke that irritates the eyes and breathing passages and can cause confusion. People who have become disoriented in fires have been found in closets, stairwells, and laundry rooms, thinking they were exits. Practicing your plan makes the actual response more of an appropriate reaction, requiring less thinking during an emergency situation.
  - Practice alerting other household members. Yell "Fire!" several times during your escape. In a real fire this will alert family members to get out.
  - Practice a crawl-low escape from your bedroom, as if you were crawling under a layer of smoke. Fires produce many toxic gases. Some are heavy and will sink low to the floor; others will rise, carrying soot towards the ceiling. Crawling with your head at a level of one to two feet above the ground above the ground will temporarily provide the best air. Close doors behind you.
  - Practice evacuating the building blindfolded. In a real fire situation, the amount of smoke generated by a fire will most likely make it impossible to see.
  - Learn the emergency number for your local fire department. After leaving your home, you will need to call this number from an outside phone or from a neighbor's house.
  - Teach family members to get out first, then call for help from a neighbor's house or outside phone. Get out of the house, away from toxic smoke and gases. If a portable phone is handy during your escape, you may take it with you, but do not waste precious time looking for one. Use your neighbor's phone, a car phone, or nearby pay phone to call for help.
  - Practice getting out of your home during the day and night. Fire can happen at any time. Practicing your routes at night will help you move more quickly should a fire strike in the dark.
- Discuss fires with your family. Everyone should know what to do in case all family members are not together. Discussing disaster ahead of time helps reduce fear and lets everyone know how to respond during a fire.

What to Tell Children

- Practice stop, drop, and roll. Know how to stop, drop, and roll in case your clothes catch on fire. Stop what you are doing, drop to the ground, cover your face, and roll back and forth until the flames go out. Running will only make the fire burn faster. Practicing makes the actual response more of an appropriate reaction, requiring less thinking time

during an actual emergency situation. Children have a tendency to confuse this message with messages about escaping from a fire, so make sure that they understand that "stop, drop, and roll" is to be used only when clothing catches on fire. Once the flames are out, cool the burned skin with water for 10 to 15 minutes and get medical attention.

- Matches and lighters are tools for "grown-ups." These tools help adults use fire properly. Instruct children to tell an adult right away if they find them or see someone playing with fire, matches, or lighters. National Fire Protection Association (NFPA) research has shown that children associate tools with grown-ups, and "grown-up" is a term children use for someone in authority.
- If a fire starts in your home or you hear the smoke alarm, yell "Fire!" several times and go outside right away. Smoke alarms go off because there is enough smoke and toxic gas to cause harm. Yell to let people know the emergency is real, and they should get out. If you live in a building with elevators, use the stairs. Never try to hide from fire. Leave all your things where they are and save yourself.
- If your escape route is filled with smoke, use your second way out. It is very hard to find your way through thick, heavy smoke. Using your second way out will provide a safer alternative.
- Practice crawling low. If you must escape through smoke, crawl low, under the smoke, to escape. Fires produce many poisonous gases. Some are heavy and will sink low to the floor; others will rise, carrying soot towards the ceiling. Crawling with your head at a level of one to two feet above the ground will temporarily provide the best air. Close doors behind you.
- If you are escaping through a closed door, feel the door, cracks, and doorknob with the back of your hand before opening the door. If it is cool and there is no smoke at the bottom or top, open the door slowly. If you see smoke or fire beyond the door, close it and use your second way out. If the door is at all warm, use your second way out. It is a natural tendency to automatically use the door, but fire may be right outside. Feeling the door will warn you of possible danger. The back of your hand is more sensitive to heat than the palm or fingers.
- If smoke, heat, or flames block your exit routes and you cannot get outside safely, stay in the room with the door closed. Open the window for ventilation, and hang a sheet outside the window so firefighters can find you. If there is a phone in the room, call the fire department and tell them where you are. Seal around doors and vents with duct tape, towels, or sheets to help slow deadly smoke from entering the room. Wait by the window for help. The first thing

firefighters will do when they arrive at a fire is check for trapped persons. Hanging a sheet out lets them know where to find you.

- Get out as safely and quickly as you can. The less time you are exposed to poisonous gases, heat, or flames, the safer you will be.
- Once you are outside, go to your meeting place and then send one person to call the fire department. Ask children if they know where their outside meeting place is. Tell them to go directly to this meeting place in case of a fire and stay there. Gathering in a specific outside location in front will quickly let you know who is outside, and allow you to advise firefighters of who may need help and their probable location inside.
- Once you are out, stay out. Children are often concerned about the safety of their pets, so discuss this issue before a fire starts. In many cases, pets are able to get out on their own. Many people are overcome by smoke and poisonous gases while trying to rescue others, pets, or possessions. No one should go into a burning or smoking building except a trained firefighter who has proper breathing apparatus and protective clothing.
- Firefighters are our friends, and they will help in case of a fire. Visit a fire station to help ease children's fears. A fire suit and mask are often frightening and children may try to hide from a firefighter in full protective gear.

How to Protect Your Property

Smoke Alarms

- If smoke alarms are not already in place, install them outside each sleeping area and on each additional level of your home in accordance with local codes. Smoke alarms cut your chances of dying in a home fire nearly in half. Smoke alarms sense abnormal amounts of smoke or invisible combustion gases in the air. They can detect both smoldering and flaming fires. The *National Fire Alarm Code*® (NFPA 72) now requires hard-wired smoke alarms in new homes.
- If people sleep with doors closed, install smoke alarms inside sleeping areas too. If a fire occurs inside the room, dangerous gases can cause heavier sleep. Smoke alarms inside bedrooms will be more likely to wake you.
- Vacuum cobwebs and dust from your smoke alarms monthly. Smoke alarms are less sensitive when they are dirty. Keep them operating most efficiently.
- Use the test button to test your smoke alarms once a month. The test feature tests all electronic functions and is safer than testing

with a controlled fire (matches, lighters, cigarettes). If necessary, replace batteries immediately. Make sure children know what your smoke alarm sounds like.

- If you have battery-powered smoke alarms, replace batteries at least once a year. Some agencies recommend you replace batteries when the time changes from standard daylight savings each spring and again in the fall. “Change your clock, change your batteries,” is a positive theme and has become a common phrase. While replacing batteries this often certainly will not hurt, available data show that batteries will last at least a year, so more frequent replacement is not necessary. Also, time does not change in Arizona, Hawaii, the eastern portion of Indiana, Puerto Rico, American Samoa, and Guam.
- Replace your smoke alarms every 10 years. Smoke alarms become less sensitive over time. This is a joint recommendation by the National Fire Protection Association and the U.S. Consumer Products Safety Commission.

Fire Extinguishers

- Consider having one or more working fire extinguishers in your home. There are three home fire extinguisher ratings: “A” rated extinguishers are for wood or paper fires only; “B” rated extinguishers are for flammable liquid and grease fires; and “C” rated extinguishers are for electrical fires. You can get fire extinguishers that have multiple ratings. An extinguisher rated A-B-C is recommended for home use. Smaller fire extinguishers are designed for one-time use and cannot be recharged.
- Get training from the fire department or a fire extinguisher manufacturer on how to use your fire extinguisher. Fire extinguishers from various manufacturers operate in different ways. Unless you know how to use your extinguisher, you may not be able to use it effectively. There is no time to read directions during an emergency. Only adults should handle and use extinguishers.
- Install extinguishers high on the wall, near an exit and away from heat sources. Extinguishers should be easily accessible to adults trained to use them, and kept away from children’s curious hands. Heat may make the contents less effective or cause the extinguisher to lose its charge more quickly.
- If you try to use a fire extinguisher on a fire and the fire does not immediately die down, drop the extinguisher and get out. Most portable extinguishers empty in 8 to 10 seconds. After some residential fires, people have been found dead with fire extinguishers near them or in their arms.

- Look at your fire extinguisher to ensure it is properly charged. Fire extinguishers will not work properly if they are not properly charged. Use the gauge or test button to check proper pressure. Follow manufacturer's instructions for replacement or recharging fire extinguishers. If the unit is low on pressure, damaged, or corroded, replace it or have it professionally serviced.

Home Fire Sprinkler Systems

- Consider installing an automatic fire sprinkler system in your home. Although smoke alarms are essential in every household, they're designed to detect, not control, a fire. Home fire sprinklers complement the alarms' work, providing a way to fight flames immediately. In less time than it would take the fire department to arrive on the scene, home fire sprinklers can contain and even extinguish a fire. There's less damage and less chance of deadly smoke and gases reaching your family. In addition, sprinkler systems can put out fire when you are away from home, and if they are connected to an alarm system, may notify the fire department in your absence.
    - When building a home, for about the same expenditure of installing carpet, upgrading cabinets, or adding a spa, you can install a home fire sprinkler system to safeguard your family. A good rule of thumb estimate is to add one to one-and-a-half percent to the cost of new housing. Fire sprinklers can also be installed in existing homes. When you consider the degree of built-in reliability and responsiveness that home fire sprinklers offer, the investment is a wise one.
    - Modern residential sprinklers are inconspicuous and can be mounted flush with walls or ceilings. Some sprinklers can even be concealed. Just like regular plumbing, pipes can be hidden behind ceilings or walls.
    - Some insurance companies provide significant discounts when automatic fire sprinkler systems are installed.
    - Sprinklers keep fires small. In sprinklered residences, 90 percent of fires are contained by the operation of just one sprinkler. Each head is independently activated by the heat of a fire as needed. Only the sprinkler heads in the immediate area of the flames will operate.
    - The odds are 1 in 16 million that a sprinkler will accidentally discharge because of a manufacturing defect. One study concluded that improper sprinkler operation is generally less likely and less severe than mishaps involving standard home plumbing systems. Despite the "sight gags" on television sit-coms, burnt toast or cigarette smoke is not enough to trigger sprinkler operation.

- Home fire sprinklers decrease fire damage by as much as two-thirds in residences with fire sprinklers when compared with those without sprinklers. Because the fire sprinkler system reacts so quickly, it can dramatically reduce the heat, flames, and smoke produced in a fire. And, home fire sprinkler systems release only 10 to 26 gallons of water per minute. In a home without sprinklers, a fire department often arrives after the fire has grown to dangerous levels. At that point, a number of hose streams must be applied to the fire at 125 gallons per minute for each hose. The resulting water damage is actually much lower with home fire sprinklers.
- To ensure sprinkler system reliability, be sure to use a qualified contractor who adheres to NFPA codes and standards and local fire safety regulations.

Media and Community Education Ideas

- Publish a newspaper series on how to recognize potential fire hazards in the home and workplace.
- Run a story featuring interviews with local fire officials about how to make homes fire-safe.
- Provide tips on conducting fire drills in the home, mentioning the need for multiple escape routes and a meeting place outside of the home.
- Highlight the importance of home smoke alarms by running monthly "battery-check reminders."

Help Prevent Fires

- Avoid smoking in bed, or when drowsy or medicated. Bed linens are highly combustible. It is easier to be burned, and highly likely individuals will suffer severe burns, when fires start in beds. Drowsy or medicated people may forget lit materials, resulting in fire.
- Provide smokers with deep, sturdy ash trays. Douse cigarette and cigar butts with water before disposal. Smoking materials is the leading cause of residential fire deaths in the United States.
- Keep matches and lighters up high, away from children, preferably in a locked cabinet. Children are fascinated by fire and may play with matches and lighters if they are not kept out of reach.
- Make sure your home heating source is clean and in working order. Many home fires are started by poorly maintained furnaces or stoves, cracked or rusted furnace parts, or chimneys with creosote buildup.

- Use portable heaters in well-ventilated rooms only. Keep blankets, clothing, curtains, furniture, and anything that could get hot and catch fire at least three feet away from all heat sources. Plug heaters directly into the wall socket and unplug them when they are not in use. Portable heaters use oxygen and produce potentially toxic gases. It is best to keep them well-ventilated to avoid gas build-up.
- Use kerosene heaters only if permitted by law in your area. Refuel kerosene heaters outdoors only, after they have cooled. Kerosene has a low flash point. If mistakenly dripped on hot surfaces, it can cause fires.
- Have chimneys and wood stoves inspected annually and cleaned if necessary. Chimneys and wood stoves build up creosote, which is the residue left behind by burning wood. Creosote is flammable and needs to be professionally removed periodically.
- Keep the stove area clean and clear of combustibles, such as towels, clothing, curtains, bags, boxes, and other appliances. Combustible materials near stoves may catch fire quickly when your attention is elsewhere.
- Cook with short or restrained sleeves. Loose sleeves can catch fire quickly.
- Conduct a home hazard hunt. Many things around the home can be fire hazards. Taking time to look for and eliminate hazards greatly reduces your risk.
    - Check electrical wiring in your home. Fix frayed extension cords, exposed wires, or loose plugs.
    - Make sure wiring is not under rugs, over nails, or in high traffic areas.
    - Outlets should have cover plates and no exposed wiring.
    - Avoid overloading outlets or extension cords.
    - Only purchase appliances and electrical devices that bear the label of a testing laboratory such as Underwriter's Laboratories (UL), Factory Mutual (FM), etc.
    - Store combustible materials in open areas away from heat sources.
    - Place rags used to apply household chemicals in metal containers with tight-fitting lids.
- Buy only testing laboratory–labeled heaters and follow the manufacturer's directions. Heaters that have gone through rigorous testing and are approved for use in the home are less likely to cause fire.

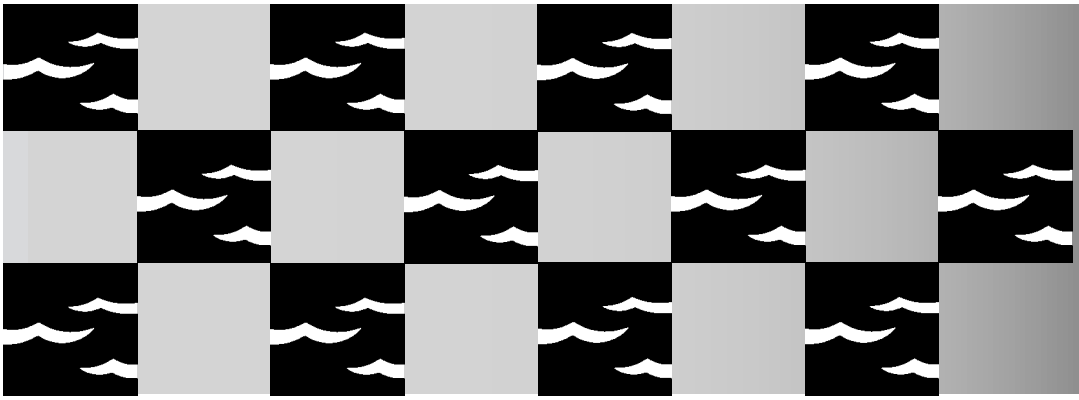
What to Do During a Fire

- Get out as quickly and as safely as possible. The less time you are exposed to poisonous gases, the safer you will be.
- If a stove fire starts, slide a lid over the burning pan and turn off the burner. Leave the lid in place until the pan is completely cool. Using a lid to contain and smother the fire is your safest action. Getting the fire extinguisher or baking soda to extinguish the fire delays action. Flour and other cooking products can react explosively to flame and should never be sprinkled over fire. Moving the pan can cause serious injury or spread the fire. Never pour water on grease fires.
- If you try to use a fire extinguisher on a fire and the fire does not immediately die down, drop the extinguisher and get out. Most portable extinguishers empty in 8 to 10 seconds. After some residential fires, people have been found dead with fire extinguishers near them or in their arms.
- If you are escaping through a closed door, feel the door, cracks, and doorknob with the back of your hand before opening the door. If it is cool and there is no smoke at the bottom or top, open the door slowly. If you see smoke or fire beyond the door, close it and use your second way out. If the door is warm, use your second way out. It is a natural tendency to automatically use the door, but fire may be right outside. Feeling the door will warn you of possible danger.
- If you see smoke or fire in your first escape route, use your second way out. The less time you are exposed to poisonous gases or flames, the safer you will be.
- If you must exit through smoke, crawl low under the smoke to your exit. Fires produce many poisonous gases. Some are heavy and will sink low to the floor; others will rise carrying soot towards the ceiling. Crawling with your head at a level of one to two feet above the ground will temporarily provide the best air.
- Close doors behind you as you escape to delay the spread of the fire.
- If smoke, heat, or flames block your exit routes and you cannot get outside safely, stay in the room with the door closed. Open the window for ventilation, and hang a sheet outside the window so firefighters can find you. Wait by the window for help. The first thing firefighters will do when they arrive at a fire is check for trapped persons. Hanging a sheet out lets them know where to find you. If there is a phone in the room, call the fire department and tell them where you are.

- Once you are out, stay out! Firefighters are trained and equipped to enter burning buildings. If someone is still inside, direct them to that person's probable location.
- Get out first, away from toxic smoke and gases, then call the fire department from a neighbor's home or from an outside phone. If a portable phone is handy during your escape, you may take it with you, but do not waste precious time looking for one. Use your neighbor's phone, a car phone, or nearby pay phone to call for help.

What to Do After a Fire

- Give first aid where needed. After calling 9-1-1 or your local emergency number, cool and cover burns, which reduces the chance of further injury or infection. Seriously injured or burned victims should be transported to professional medical help immediately.
- Stay out of fire-damaged homes until local fire authorities say it is safe to re-enter. Fire may have caused damage that could injure you or your family. There may be residual smoke or gases that are unsafe to breathe.
- Look for structural damage. Fire authorities may allow you to re-enter, but may not have completed a thorough inspection. Look for damage that will need repair.
- Check that all wiring and utilities are safe. Fire may cause damage inside walls and to utility lines not normally visible.
- Discard food that has been exposed to heat, smoke, or soot. The high temperatures of fire and its by-products can make food unsafe.
- Contact your insurance agent. Don't discard damaged goods until an inventory has been taken. Save receipts for money spent relating to fire loss. Your insurance agent may provide immediate help with living expenses until you are able to return home, and offer assistance for repairs.



Flood and Flash Flood

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/ CSREES, and USGS

Why talk about floods?

Floods are among the most frequent and costly natural disasters in terms of human hardship and economic loss. As much as 90 percent of the damage related to all natural disasters (excluding droughts) is caused by floods and associated debris flows. Most communities in the United States can experience some kind of flooding. Over the 10-year period from 1988 to 1997, floods cost the Nation, on average, $3.7 billion annually. The long-term (1940 to 1999) annual average of lives lost is 110 per year, mostly as a result of flash floods.

What causes floods?

Flooding occurs in known floodplains when prolonged rainfall over several days, intense rainfall over a short period of time, or an ice or debris jam causes a river or stream to overflow and flood the surrounding area. Melting snow can combine with rain in the winter and early spring; severe thunderstorms can bring heavy rain in the spring and summer; or tropical cyclones can bring intense rainfall to the coastal and inland states in the summer and fall.

Floods are among the most frequent and costly natural disasters in terms of human hardship and economic loss...most communities in the United States can experience some kind of flooding.

Flash floods occur within six hours of a rain event, or after a dam or levee failure, or following a sudden release of water held by an ice or debris jam, and flash floods can catch people unprepared. You will not always have a warning that these deadly, sudden floods are coming. So if you live in areas prone to flash floods, plan now to protect your family and property.

As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Urbanization increases runoff two to six times over what would occur on natural terrain. During periods of

urban flooding, streets can become swift moving rivers, while basements and viaducts can become death traps as they fill with water.

Several factors contribute to flooding. Two key elements are rainfall intensity and duration. Intensity is the rate of rainfall, and duration is how long the rain lasts. Topography, soil conditions, and ground cover also play important roles. Most flash flooding is caused by slow-moving thunderstorms, thunderstorms repeatedly moving over the same area, or heavy rains from hurricanes and tropical storms. Floods, on the other hand, can be slow- or fast-rising, but generally develop over a period of hours or days.

Learn about flooding and flash flooding in your area by contacting the local emergency management office, National Weather Service (NWS) office, your American Red Cross chapter, or your planning and zoning department. If you are at risk, take steps to reduce damage and the risk of injury or loss to your family.

Awareness Information

Know the difference between WATCHES and WARNINGS.

- A National Weather Service WATCH is a message indicating that conditions favor the occurrence of a certain type of hazardous weather. For example, a severe thunderstorm watch means that a severe thunderstorm is expected in the next six hours or so within an area approximately 120 to 150 miles wide and 300 to 400 miles long (36,000 to 60,000 square miles). The NWS Storm Prediction Center issues such watches. Local NWS forecast offices issue other watches (flash flood, winter weather, etc.) 12 to 36 hours in advance of a possible hazardous-weather or flooding event. Each local forecast office usually covers a state or a portion of a state.
- An NWS WARNING indicates that a hazardous event is occurring or is imminent in about 30 minutes to an hour. Local NWS forecast offices issue warnings on a county-by-county basis.

Many more WATCHES are issued than WARNINGS. A WATCH is the first sign a flood may occur, and when one is issued, you should be aware of potential flood hazards.

Be aware of flood hazards. Floods can roll boulders, tear out trees, destroy buildings and bridges, and scour out new channels. Flood waters can reach heights of 10 to 20 feet and often carry a deadly cargo of debris. Flood-producing rains can also trigger catastrophic debris slides.

Regardless of how a flood or flash flood occurs, the rule for being safe is simple: head for higher ground and stay away from flood waters. Even a shallow depth of fast-moving flood water produces more force than most people imagine. The most dangerous thing you can do is to try walking, swimming, or driving through flood waters. Two feet of water will carry away most automobiles.

Plan for a Flood

Develop a Family Disaster Plan. Please see the "Family Disaster Plan" section for general family planning information. Develop flood-specific planning. Learn about your area's flood risk and elevation above flood stage. Contact your local Red Cross chapter, emergency management office, local National Weather Service office, or planning and zoning department about your area's flood risk. Knowing the elevation of your property in relation to nearby streams and dams will let you know if forecasted flood levels will affect your home.

If you are at risk from floods:

- Talk to your insurance agent. Homeowners' policies do not cover flooding. Ask about the National Flood Insurance Program (NFIP).
- Use a NOAA Weather Radio with a tone-alert feature, or a portable, battery-powered radio (or television) for updated emergency information.
- Develop an evacuation plan. (See "Evacuation" in the "Family Disaster Plan" section.) Everyone in your family should know where to go if they have to leave. Trying to make plans at the last minute can be upsetting and create confusion.
- Discuss floods with your family. Everyone should know what to do in case all family members are not together. Discussing floods ahead of time helps reduce fear and anxiety and lets everyone know how to respond.

What to Tell Children

- If you come upon flood waters, *stop, turn around, and go another way.* Climb to higher ground. If it is moving swiftly, even water six inches deep can knock you off your feet. Many people are swept away wading through flood waters, resulting in injury or death.
- Stay away from flooded areas. Even if it seems safe, flood waters may still be rising.
- Never try to walk, swim, drive, or play in flood water. You may not be able to see on the surface how fast flood water is moving or see holes and submerged debris.
- If you are in a vehicle and become surrounded by water, if you can get out safely, do so immediately and move to higher ground. Vehicles can be swept away in two feet of water.
- Watch out for snakes in areas that were flooded. Flood waters flush snakes from their homes.
- Stay away from creek and stream banks in flooded and recently flooded areas. The soaked banks often become unstable due to heavy

rainfall and can suddenly give way, tossing you into rapidly moving water.

- Never play around high water, storm drains, ditches, ravines, or culverts. It is very easy to be swept away by fast moving water.
- Throw away all food that has come into contact with flood waters. Contaminated flood water contains bacteria and germs. Eating foods exposed to flood waters can make you very sick.

How to Protect Your Property

- Keep insurance policies, documents, and other valuables in a safe-deposit box. You may need quick, easy access to these documents. Keep them in a safe place less likely to be damaged during a flood.
- Avoid building in a floodplain unless you elevate and reinforce your home. Some communities do not permit building in known floodplains. If there are no restrictions, and you are building in a floodplain, take precautions, making it less likely your home will be damaged during a flood.
- Raise your furnace, water heater, and electric panel to higher floors or the attic if they are in areas of your home that may be flooded. Raising this equipment will prevent damage. An undamaged water heater may be your best source of fresh water after a flood.
- Install check valves in building sewer traps to prevent flood water from backing up into the drains of your home. As a last resort, when floods threaten, use large corks or stoppers to plug showers, tubs, or basins.
- Construct barriers such as levees, berms, and flood walls to stop flood water from entering the building. Permission to construct such barriers may be required by local building codes. Check local building codes and ordinances for safety requirements.
- Seal walls in basements with waterproofing compounds to avoid seepage through cracks.
- Consult with a construction professional for further information if these and other damage reduction measures can be taken. Check local building codes and ordinances for safety requirements.
- Contact your local emergency management office for more information on mitigation options to further reduce potential flood damage. Your local emergency management office may be able

Assemble a Disaster Supplies Kit

Please see the section "Disaster Supplies Kit" for general supplies kit information. Flood-specific supplies should include the following:

- Disaster Supplies Kit basics.
- Evacuation Supply Kit.
- If you live in a frequently flooded area, stockpile emergency building materials. These include plywood, plastic sheeting, lumber, nails, hammer and saw, pry bar, sand, shovels, and sandbags.

to provide additional resources and information on ways to reduce potential damage.

Media and Community Education Ideas

- Have your community join the National Flood Insurance Program. Any community may join the NFIP. Check with your local emergency management office for more information.
- Publish a special section in your local newspaper with emergency information on floods and flash floods. Localize the information by printing the phone numbers of local emergency services offices, the American Red Cross chapter, and the nearest hospitals.
- Interview local officials about land use management and building codes in floodplains.
- Work with local emergency services and American Red Cross officials to prepare special reports for people with mobility impairments about what to do if an evacuation is ordered.
- Periodically inform your community of local public warning systems. Explain the difference between flood watches and warnings. Let them know where to turn for emergency broadcast information should they hear a warning on their radio or television.
- Assist hospitals and other operations that are critically affected by power failure by arranging for auxiliary power supplies.
- Contact your local National Weather Service office or emergency management agency for information on local flood warning systems. River and rainfall readings are valuable to local emergency management agencies and the NWS in assessing flood conditions and taking appropriate actions. Advanced warning provided by early detection is critical to saving lives. Automatic flood detection systems are available commercially for flood-prone communities.
- Publish emergency evacuation routes for areas prone to flooding.

What to Do Before Flooding Occurs

- If it has been raining hard for several hours, or steadily raining for several days, be alert to the possibility of a flood. Floods happen as the ground becomes saturated.
- Use a NOAA Weather Radio or a portable, battery-powered radio (or television) for updated emergency information. Local stations provide the best advice for your particular situation.
- Listen for distant thunder. In some types of terrain, runoff from a faraway thunderstorm could be headed your way.

- If you are stopping your vehicle, camp or park away from streams and washes, particularly during threatening conditions. Flood waters can rise quickly and carry you or your belongings away.
- When in or along stream channels, be aware of distant events, such as dam breaks or thunderstorms that may cause flash floods in the area.

What to Do During a Flood Watch

- When a flood or flash flood WATCH is issued:
  - Listen continuously to a NOAA Weather Radio, or a portable, battery-powered radio (or television) for updated emergency information. Local stations provide you with the best advice for your particular situation.
  - Everyone in a WATCH area should be ready to respond and act quickly. Floods and flash floods can happen quickly and without warning. Be ready to act immediately.
  - Be alert to signs of flooding, and if you live in a flood-prone area, be ready to evacuate at a moment's notice. Floods can happen quickly and you may need to leave with little or no notice.
  - Follow the instructions and advice of local authorities. Local authorities are the most informed about affected areas. They will best be able to tell you areas to avoid.
- If your residence is in a flood-prone area:
  - Fill bathtubs, sinks, and plastic bottles with clean water. Water may become contaminated or service may be interrupted.
  - Bring outdoor belongings, such as patio furniture, indoors. Unsecured items may be swept away and damaged by flood waters.
  - Move your furniture and valuables to higher floors of your home. If flood waters affect your home, higher floors are less likely to receive damage.
  - If you are instructed by local authorities, turn off all utilities at the main power switch and close the main gas valve. In some areas, local authorities may advise you to turn off utilities to prevent further damage to homes and the community.
  - Get your preassembled disaster supplies ready. You may need to act quickly. Having your supplies ready will save time.
  - Fill your car's gas tank, in case an evacuation notice is issued. If electric power is cut off, gas stations may not be able to operate pumps for several days.

- Be prepared to evacuate. Local officials may ask you to leave if they truly feel your home is at risk from flood waters.

What to Do During a Flood Warning

When a flood or flash flood WARNING is issued:

- Listen continuously to a NOAA Weather Radio, or a portable, battery-powered radio (or television) for updated emergency information. Local stations provide you with the best advice for your particular situation.
- Be alert to signs of flooding. A WARNING means a flood is imminent or is happening in the area.
- If you live in a flood-prone area or think you are at risk, evacuate immediately. Move quickly to higher ground. Save yourself, not your belongings. The most important thing is your safety.
- Follow the instructions and advice of local authorities. Local authorities are the most informed about affected areas. They will best be able to tell you areas to avoid.
- If advised to evacuate, do so immediately. Move to a safe area before access is cut off by flood water. Evacuation is much simpler and safer before flood waters become too deep for vehicles to drive through.
- Follow recommended evacuation routes. Shortcuts or alternate, nonrecommended routes may be blocked or damaged by flood waters.
- Leave early enough to avoid being marooned by flooded roads. Delaying too long may allow all escape routes to become blocked.

Flood Safety

- Stay out of areas subject to flooding. Dips, low spots, canyons, washes, etc., can become filled with water.
- If outdoors, climb to high ground and stay there. Move away from dangerous flood waters.
- If you come upon a flowing stream where water is above your ankles, *stop, turn around, and go another way.* Never try to walk, swim, or drive through such swift water. Most flood fatalities are caused by people attempting to drive through water, or people playing in high water. If it is moving swiftly, even water six inches deep can sweep you off your feet.

What to Do if You Are Driving During a Flood

- Avoid already flooded areas, and areas subject to sudden flooding. Do not attempt to cross flowing streams. Most flood fatalities are caused by people attempting to drive through water, or people

playing in high water. The depth of water is not always obvious. The roadbed may be washed out under the water, and you could be stranded or trapped. Rapidly rising water may stall the engine, engulf the vehicle and its occupants, and sweep them away. Look out for flooding at highway dips, bridges, and low areas. Two feet of water will carry away most automobiles.

- If you are driving and come upon rapidly rising waters, turn around and find another route. Move to higher ground away from rivers, streams, creeks, and storm drains. If your route is blocked by flood waters or barricades, find another route. Barricades are put up by local officials to protect people from unsafe roads. Driving around them can be a serious risk.
- If your vehicle becomes surrounded by water or the engine stalls, and if you can safely get out, abandon your vehicle immediately and climb to higher ground. Many deaths have resulted from attempts to move stalled vehicles. When a vehicle stalls in the water, the water's momentum is transferred to the car. The lateral force of a foot of water moving at 10 miles per hour is about 500 pounds on the average automobile. The greatest effect is buoyancy — for every foot that water rises up the side of a car, it displaces 1,500 pounds of the car's weight. So, two feet of water moving at 10 miles per hour will float virtually any car. Many persons have been swept away by flood waters upon leaving their vehicles, which are later found without much damage. Use caution when abandoning your vehicle, and look for an opportunity to move away quickly and safely to higher ground.

What to Do After a Flood or Flash Flood

- Seek necessary medical care at the nearest hospital or clinic. Contaminated flood waters lead to a greater possibility of infection. Severe injuries will require medical attention.
- Help a neighbor who may require special assistance — infants, elderly people, and people with disabilities. Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance in emergency situations.
- Avoid disaster areas. Your presence might hamper rescue and other emergency operations, and put you at further risk from the residual effects of floods, such as contaminated waters, crumbled roads, landslides, mudflows, and other hazards.
- Continue to listen to a NOAA Weather Radio or local radio or television stations and return home only when authorities indicate it is safe to do so. Flood dangers do not end when the water

begins to recede; there may be flood-related hazards within your community, which you could hear about from local broadcasts.

- Stay out of any building if flood waters remain around the building. Flood waters often undermine foundations, causing sinking, floors can crack or break and buildings can collapse.
- Avoid entering ANY building (home, business, or other) before local officials have said it is safe to do so. Buildings may have hidden damage that makes them unsafe. Gas leaks or electric or waterline damage can create additional problems.
- Report broken utility lines to the appropriate authorities. Reporting potential hazards will get the utilities turned off as quickly as possible, preventing further hazard and injury. Check with your utility company now about where broken lines should be reported.
- Avoid smoking inside buildings. Smoking in confined areas can cause fires.
- When entering buildings, use extreme caution. Building damage may have occurred where you least expect it. Watch carefully every step you take.
    - Wear sturdy shoes. The most common injury following a disaster is cut feet.
    - Use battery-powered lanterns or flashlights when examining buildings. Battery-powered lighting is the safest and easiest, preventing fire hazard for the user, occupants, and building.
    - Examine walls, floors, doors, staircases, and windows to make sure that the building is not in danger of collapsing.
    - Inspect foundations for cracks or other damage. Cracks and damage to a foundation can render a building uninhabitable.
    - Look for fire hazards. There may be broken or leaking gas lines, flooded electrical circuits, or submerged furnaces or electrical appliances. Flammable or explosive materials may travel from upstream. Fire is the most frequent hazard following floods.
    - Check for gas leaks. If you smell gas or hear a blowing or hissing noise, open a window and quickly leave the building. Turn off the gas at the outside main valve if you can and call the gas company from a neighbor's home. If you turn off the gas for any reason, it must be turned back on by a professional.
    - Look for electrical system damage. If you see sparks or broken or frayed wires, or if you smell burning insulation, turn off the electricity at the main fuse box or circuit breaker. If you have to step in

water to get to the fuse box or circuit breaker, call an electrician first for advice. Electrical equipment should be checked and dried before being returned to service.

- Check for sewage and waterline damage. If you suspect sewage lines are damaged, avoid using the toilets and call a plumber. If water pipes are damaged, contact the water company and avoid using water from the tap. You can obtain safe water from undamaged water heaters or by melting ice cubes.
- Watch out for animals, especially poisonous snakes, that may have come into buildings with the flood waters. Use a stick to poke through debris. Flood waters flush snakes and many animals out of their homes.
- Watch for loose plaster, drywall, and ceilings that could fall.
- Take pictures of the damage, both of the building and its contents, for insurance claims.

- After returning home:
  - Throw away food that has come in contact with flood waters. Some canned foods may be salvageable. If the cans are dented or damaged, throw them away. Food contaminated by flood waters can cause severe infections.
  - If water is of questionable purity, boil or add bleach, and distill drinking water before using. (See information on water treatment under the "Disaster Supplies Kit" section.) Wells inundated by flood waters should be pumped out and the water tested for purity before drinking. If in doubt, call your local public health authority. Ill health effects often occur when people drink water contaminated with bacteria and germs.
  - Pump out flooded basements gradually (about one-third of the water per day) to avoid structural damage. If the water is pumped completely in a short period of time, pressure from water-saturated soil on the outside could cause basement walls to collapse.
  - Service damaged septic tanks, cesspools, pits, and leaching systems as soon as possible. Damaged sewage systems are health hazards.

Heat (Heat Wave)

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/ CSREES, and USGS

Why talk about extreme heat?

Heat can kill by pushing the human body beyond its limits. Under normal conditions, the body's internal thermostat produces perspiration that evaporates and cools the body. However, in extreme heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature. Elderly people, young children, and those who are sick or overweight are more likely to become victims of extreme heat. Because men sweat more than women, they are more susceptible to heat illness because they become more quickly dehydrated.

Studies have shown that a significant rise in heat-related illnesses happens when excessive heat lasts more than two days.

The duration of excessive heat plays an important role in how people are affected by a heat wave. Studies have shown that a significant rise in heat-related illnesses happens when excessive heat lasts more than two days. Spending at least two hours per day in air conditioning significantly cuts down on the number of heat-related illnesses.

What is extreme heat?

The parameters of an extreme heat watch, warning, or advisory can vary by location. Generally, temperatures that hover 10 degrees or more above the average high temperature for the region, last for prolonged periods of time, and are often accompanied by high humidity, *that the body cannot tolerate* are defined as extreme heat. A heat wave is a very dangerous situation.

People living in urban areas may be at greater risk from the effects of a prolonged heat wave than people living in rural regions. An increased health problem, especially for those with respiratory difficulties, can occur when stagnant atmospheric conditions trap pollutants in urban areas, thus adding unhealthy air to excessively hot temperatures. In addition, asphalt

and concrete store heat longer and gradually releases heat at night, which produces significantly higher nighttime temperatures in urban areas known as the "urban heat island effect."

Learn about the risk of extreme heat in your area by contacting your local emergency management office, National Weather Service office, or American Red Cross chapter.

Awareness Information

Know these terms:

- Heat wave: Prolonged period of excessive heat, often combined with excessive humidity. The National Weather Service steps up its procedures to alert the public during these periods when it anticipates an increase in human heat-related illnesses.
- Heat index: A number in degrees Fahrenheit (F) that tells how hot it really feels when relative humidity is added to the actual air temperature. Exposure to full sunshine can increase the heat index by 15°.
- Heat cramps: Heat cramps are muscular pains and spasms due to heavy exertion. Although heat cramps are the least severe, they are often the first signal that the body is having trouble with the heat.
- Heat exhaustion: Heat exhaustion typically occurs when people exercise heavily or work in a hot, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to the vital organs. This results in a form of mild shock. If not treated, the victim's condition will worsen. Body temperature will keep rising and the victim may suffer heat stroke.
- Heat stroke: Heat stroke is life-threatening. The victim's temperature control system, which produces sweating to cool the body, stops working. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly.
- Sunstroke: Another term for heat stroke.

Watch for Signals

- Heat exhaustion: Cool, moist, pale, or flushed skin; heavy sweating; headache; nausea or vomiting; dizziness; and exhaustion. Body temperature may be normal, or is likely to be rising.
- Heat stroke: Hot, red skin; changes in consciousness; rapid, weak pulse; and rapid, shallow breathing. Body temperature can be very high — sometimes as high as 105°F. If the person was sweating from heavy work or exercise, skin may be wet; otherwise, it will feel dry.

How to Treat a Heat Emergency

- Heat stroke: Heat stroke is a life-threatening situation. Help is needed fast. Call 9-1-1 or your local emergency number. Move the person to a cooler place. Quickly cool the body. Immerse victim in a cool bath, or wrap wet sheets around the body and fan it. Watch for signals of breathing problems. Keep the person lying down and continue to cool the body any way you can. If the victim refuses water, is vomiting, or there are changes in the level of consciousness, do not give anything to eat or drink.
- Heat cramps: Get the person to a cooler place and have him or her rest in a comfortable position. Lightly stretch the affected muscle and replenish fluids. Give a half glass of cool water every 15 minutes. Do not give liquids with alcohol or caffeine in them, as they can cause further dehydration, making conditions worse.
- Heat exhaustion: Get the person out of the heat and into a cooler place. Remove or loosen tight clothing and apply cool, wet cloths, such as towels or sheets. If the person is conscious, give cool water to drink. Make sure the person drinks slowly. Give a half glass of cool water every 15 minutes. Let the victim rest in a comfortable position, and watch carefully for changes in his or her condition.

Plan for Extreme Heat

Develop a Family Disaster Plan. Please see the "Family Disaster Plan" section for general family planning information. Revisit your family disaster plan before summer heat is expected. Extreme heat–specific planning should include the following:

- Learn what heat hazards may occur where you are and learn how to plan for extreme heat should it occur in your area. Different areas have different risks associated with prolonged heat. Contact your local emergency management office, National Weather Service office, or American Red Cross chapter for information.

If you are at risk from extreme heat:

- If your home does not have air conditioning, choose other places you go to get relief from the heat during the warmest part of the day. Schools, libraries, theaters and other community facilities often provide air-conditioned refuge on the hottest days. Air conditioning provides the safest escape from extreme heat. During the 1995 Midwest heat wave, most deaths happened to people not in air conditioned locations.
- Plan changes in your daily activities to avoid strenuous work during the warmest part of the day. Ill effects of heat can quickly overcome the healthiest people, if they perform strenuous work during

the warmest parts of the day. Symptoms of dehydration are not easily recognized and are often confused with other causes. Dehydration occurs fast and makes you ill very quickly.

- Some family members may be taking medications or have medical conditions that may cause poor blood circulation or reduced ability to tolerate heat. Discuss these concerns with a physician. A physician can advise you about changes to medication or other activities you can do to temporarily relieve the effects of heat.
- Plan to check on family, friends, and neighbors who do not have air conditioning or who spend much of their time alone. Elderly persons who live alone or with a working relative might need assistance on hot days. The majority of deaths during the 1995 Midwest heat wave were persons who were alone.
- Plan to wear lightweight, light-colored clothing. Light colors will reflect away the sun's rays more than dark colors, which absorb the sun's rays.
- Get training. Take an American Red Cross first aid course to learn how to treat heat emergencies and other emergencies. Everyone should know how to respond, because the effects of heat can happen very quickly.
- Discuss extreme heat wave with your family. Everyone should know what to do in the places where they spend time. Some places may not be air conditioned or safe during a heat wave, so plan alternatives. Discussing extreme heat ahead of time will help reduce fear and anxiety, and lets everyone know how to respond.

Assemble a Disaster Supplies Kit

Please see the "Disaster Supplies Kit" section for general supplies kit information. Extreme heat–specific supplies should include the following:

- Additional water.
- Disaster Supplies Kit basics.

Protect Your Property

- Install window air conditioners snugly. Insulate spaces around air conditioners for a tighter fit. An air conditioner with a tight fit around the windows or wall openings will make less noise and allow less hot air in from the outside.
- Make sure your home is properly insulated. This will help you to conserve electricity and reduce your home's power demands for air conditioning. Weather-strip doors and windowsills to keep cool air inside, allowing the inside temperature to stay cooler longer.
- During a drought, conserve water by placing a brick, or another large solid object, in your toilet tank to reduce the amount of water used in flushing.
- Consider keeping storm windows installed throughout the year.

Storm windows can keep the heat out of a house in the summer the same way they keep the cold out in the winter.

- Check air-conditioning ducts for proper insulation. Insulation around ducts prevents cool air from leaking and keeps it directed through the vents.
- Protect windows. Hang shades, draperies, awnings, or louvers on windows that receive morning or afternoon sun. Outdoor awnings or louvers can reduce the heat entering the house by as much as 80 percent.
- Use attic fans. If you have a fan installed to vent warm air out of your attic, use the fan to help keep your home cool.

Media and Community Education Ideas

- Publish a special newspaper section with emergency information on extreme heat. Localize the information by including the phone numbers of local emergency services offices, the American Red Cross chapter, and local hospitals.
- Interview local physicians about the dangers of sunburn, heat exhaustion, heat stroke, and other possible conditions caused by excessive heat.
- During a drought, run a series of programs suggesting ways that individuals can conserve water and energy in their homes and their workplaces.
- Interview local officials and representatives of the U.S. Department of Agriculture about special steps farmers can take to establish alternative water supplies for their crops and ways to protect livestock and poultry from the effects of extreme heat.
- Sponsor a "Helping Your Neighbors" program through your local school system to encourage children to think of those persons who require special assistance during severe weather conditions, such as elderly people, infants, or people with disabilities.
- Arrange for air-conditioned shelters to be opened when necessary for community members who do not have air conditioning at home.
- Arrange for special programs to provide air conditioners to vulnerable people in their homes.

What to Do During Extreme Heat

- Slow down. Avoid strenuous activity. Reduce, eliminate or reschedule strenuous activities. High-risk individuals should stay in cool places. Get plenty of rest to allow your natural "cooling system" to work. If you must do strenuous activity, do it during the coolest part of the day,

which is usually in the morning between 4:00 a.m. and 7:00 a.m. Many heat emergencies are experienced by people exercising or working during the hottest part of the day.

- Avoid too much sunshine. Sunburn slows the skin's ability to cool itself. The sun will also heat the inner core of your body, resulting in dehydration. Use a sunscreen lotion with a high sun protection factor (SPF) rating.
- Postpone outdoor games and activities. Extreme heat can threaten the health of athletes, staff, and spectators of outdoor games and activities.
- Avoid extreme temperature changes. A cool shower immediately after coming in from hot temperatures can result in hypothermia, particularly for elderly and very young people.
- Stay indoors as much as possible. If air conditioning is not available, stay on the lowest floor, out of the sunshine. Even in the warmest weather, staying indoors, out of sunshine, is safer than long periods of exposure to the sun.
- Keep heat outside and cool air inside. Close any registers that may allow heat inside. Install temporary reflectors, such as aluminum foil covered cardboard, in windows and skylights to reflect heat back outside.
- Conserve electricity not needed to keep you cool. During periods of extreme heat, people tend to use a lot more power for air conditioning. Conserve electricity not used to keep you cool so power can remain available and reduce the chance of a community wide outage.
- Vacuum air conditioner filters weekly during periods of high use. Air conditioner filters can become clogged or filled with dirt, making them less efficient. Keeping them clean will allow your air conditioner to provide more cool air.
- If your home does not have air conditioning, go to a public building with air conditioning each day for several hours. Air conditioned locations are the safest places during extreme heat because electric fans do not cool the air. Fans do help sweat evaporate, which gives a cooling effect.
- Dress appropriately:
    - Wear loose-fitting, lightweight, light-colored clothing that will cover as much skin as possible. Lightweight, light-colored clothing reflects heat and sunlight and helps maintain normal body temperature. Cover as much skin as possible to avoid sunburn and overwarming effects of sunlight on your body.

    - Protect face and head by wearing a wide-brimmed hat. A hat will keep direct sunlight off your head and face. Sunlight can burn and warm the inner core of your body.

- Drink plenty of fluids even if you do not feel thirsty. Injury and death can occur from dehydration, which can happen quickly and unnoticed. Symptoms of dehydration are often confused with other causes. Persons who have epilepsy or heart, kidney, or liver disease; who are on fluid-restrictive diets; or who have a problem with fluid retention should consult a doctor before increasing liquid intake.
- Take frequent breaks if you must work outdoors. Frequent breaks, especially in a cool area or to drink fluids, can help people tolerate heat better.
- Use a buddy system when working in extreme heat. Partners can keep an eye on each other and can assist each other when needed. Sometimes exposure to heat can cloud judgment. Chances are if you work alone, you may not notice this.
- Drink plenty of water regularly and often. Your body needs water to keep cool. Water is the safest liquid to drink during heat emergencies.
- Avoid drinks with alcohol or caffeine in them. They can make you feel good briefly, but make the heat's effects on your body worse. This is especially true about beer, which actually dehydrates the body.
- Eat small meals and eat more often. Large, heavy meals are more difficult to digest and cause your body to increase internal heat to aid digestion, worsening overall conditions. Avoid foods that are high in protein, such as meats and nuts, which increase metabolic heat.
- Avoid using salt tablets unless directed to do so by a physician. Salt causes the body to retain fluids, resulting in swelling. Salt affects areas of your body that help you sweat, which would keep you cool. Persons on salt-restrictive diets should check with a physician before increasing salt intake.
- NEVER leave children or pets alone in closed vehicles. Temperatures inside a closed vehicle can reach over 140°F within minutes. Exposure to such high temperatures can kill in minutes.

Hurricane

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/CSREES, and USGS

Why talk about hurricanes?

There are no other storms like hurricanes on Earth. Views of hurricanes from satellites located thousands of miles above the Earth show how these powerful, tightly coiled weather systems are unique. Each year, on average, 10 tropical storms (of which six become hurricanes) develop over the Atlantic Ocean, Caribbean Sea, or Gulf of Mexico. Many of these storms remain over the ocean. However, an average of five hurricanes strike the United States coastline every three years. Of these five, two will be major hurricanes, which are storms of category 3 or higher on the Saffir-Simpson scale, which corresponds to hurricanes with winds at or above 111 miles per hour.

An average of five hurricanes strike the United States coastline every three years. Of these five, two will be major hurricanes...

Timely warnings have greatly diminished hurricane fatalities in the United States. In spite of this, property damage continues to mount. There is little we can do about the hurricanes themselves. However, the National Oceanic and Atmospheric Administration's (NOAA's) Tropical Prediction Center and National Weather Service (NWS) field offices team up with other federal, state, and local agencies; rescue and relief organizations; the private sector; and the news media in a huge warning and preparedness effort.

What are hurricanes, and what causes them?

Hurricanes and tropical storms are cyclones with tropical origins (tropical cyclones). When the winds of a tropical storm (winds 39 to 73 miles per hour) reach a constant speed of 74 miles per hour or more, it is called a hurricane. Hurricane winds blow in a large spiral around a relatively calm center known as the "eye." The "eye" is generally 20 to 30 miles wide, and the storm may have a diameter of 400 miles across. As a hurricane approaches, the skies will begin to darken and winds will grow in strength.

A hurricane can bring torrential rains, high winds, and storm surge as it nears land. A single hurricane can last more than two weeks over open waters and can run a path across the entire length of the eastern seaboard.

More dangerous than the high winds of a hurricane is the storm surge — a dome of ocean water that can be 20 feet high at its peak and 50 to 100 miles wide. The surge can devastate coastal communities as it sweeps ashore. In recent years, the fatalities associated with storm surge have been greatly reduced as a result of better warning and preparedness within coastal communities.

Most deaths due to tropical cyclones are flood-related. Inland flooding is a common occurrence with hurricanes and tropical storms. Torrential rains from decaying hurricanes and tropical storms can produce extensive urban and river flooding. Winds from these storms located offshore can drive ocean water up the mouth of rivers, compounding the severity of inland flooding. Inland streams and rivers can flood and trigger landslides. Mudslides can occur in mountainous regions. In addition, hurricanes can spawn tornadoes, which add to the destructiveness of the storm.

Learn about hurricane risk in your community by contacting your local emergency management office, National Weather Service office, or American Red Cross chapter.

Awareness Information

- A National Weather Service WATCH is a message indicating that conditions favor the occurrence of a certain type of hazardous weather. For example, a severe thunderstorm watch means that a severe thunderstorm is expected in the next six hours or so within an area approximately 120 to 150 miles wide and 300 to 400 miles long (36,000 to 60,000 square miles). The NWS Storm Prediction Center issues such watches. Local NWS forecast offices issue other watches (flash flood, winter weather, etc.) 12 to 36 hours in advance of a possible hazardous-weather or flooding event. Each local forecast office usually covers a state or a portion of a state.
- An NWS WARNING indicates that a hazardous event is occurring or is imminent in about 30 minutes to an hour. Local NWS forecast offices issue warnings on a county-by-county basis.
- A hurricane WATCH is issued when there is a threat of hurricane conditions within 24 to 36 hours.
- A hurricane WARNING is issued when hurricane conditions are expected in 24 hours or less.

Many people do not realize the threat of hurricanes as each one is different. Over the past several years, U.S. hurricane warning systems have provided adequate time for people on barrier islands and the immediate coastline to move inland when hurricanes threaten. However, due to

rapid population growth, it is becoming more difficult to evacuate people from the barrier islands and other coastal areas because roads have not kept pace with the expansion. The problem is further compounded by the fact that 80 to 90 percent of the population now living in hurricane-prone areas have never experienced the core of a "major" hurricane. Many of these people have been through weaker storms. The result is a false impression of a hurricane's damage potential. This often leads to complacency and delayed actions, which could result in the loss of many lives.

Plan for a Hurricane

Develop a Family Disaster Plan. Please see the "Family Disaster Plan" section for general family planning information. Hurricane-specific planning should include the following:

- Learn about your community's risk from hurricanes. Contact your local emergency management office, local National Weather Service office, or local chapter of the American Red Cross for more information on hurricanes and how to prepare for them.
- If your community is at risk from hurricanes, contact the local emergency management office or planning and zoning office to find out if you live in an area that could flood during a hurricane or heavy rains. If you live in a risk area, learn what types of supplies should be stored to protect your home from flood waters. Knowing the elevation of your property in relation to nearby streams and dams will let you know if forecasted flood levels will affect your home.

If you are at risk from hurricanes:

- Talk to your insurance agent. Homeowners' policies do not cover flooding from hurricanes. Ask about the National Flood Insurance Program (NFIP).
- Ask about your community's hurricane preparedness plan. The local emergency management office or local chapter of the American Red Cross should be able to provide you with details of this plan, including information on the safest evacuation routes, nearby shelters, advice on when schools would be closed and what conditions are necessary for recommended evacuation of certain areas.
- Develop an evacuation plan. (See "Evacuation" in the "Family Disaster Plan" section.) Everyone in your family should know where to go if they have to leave. Trying to make plans at the last minute can be upsetting and create confusion.
- Determine where to move your boat in an emergency. Marinas and other storage facilities may fill up quickly. Some locations may have less risk of damage than others. You may be required to secure your boat well in advance of approaching hurricanes.

- Discuss hurricanes with your family. Everyone should know what to do in case all family members are not together. Discussing hurricanes ahead of time will help reduce fear and anxiety, and lets everyone know how to respond. Review flood safety and preparedness measures with your family.

Assemble a Disaster Supplies Kit

Please see the "Disaster Supplies Kit" section for general supplies kit information. Hurricane-specific supplies should include the following:

- A week's supply of food and water (to be kept at home in addition to the recommended three-day supply for your evacuation kit).
- Disaster Supply Kit basics.
- Evacuation Supplies Kit.

How to Protect Your Property

- Make a list of items to bring inside in the event of a storm. A list will help you remember anything that can be broken or picked up by strong winds. Hurricane winds, often in excess of 100 miles per hour, can turn unanchored items into deadly missiles, causing damage or injury when they hit.
- Keep trees and shrubbery trimmed. Make trees more wind resistant by removing diseased or damaged limbs, then strategically remove branches so that wind can blow through. Hurricane winds frequently break weak limbs and hurl them at great speed, causing great damage when they hit property. Debris collection services may not be operating just before a storm, so it is best to do this well in advance of approaching storms.
- Remove any debris or loose items in your yard. Hurricane winds can pick up anything unsecured, creating damage to property when the debris hits.
- Clear loose and clogged rain gutters and downspouts. Hurricanes often bring long periods of heavy rain. Providing clear drainage will help prevent misdirected flooding.
- Install permanent hurricane shutters. Hurricane shutters provide the best protection for your windows and doors. Taping windows could take critical time from more effective preparedness measures. All tape does is help prevent glass from broken windows from scattering all over inside. Tape does not prevent windows from breaking. Cover the outside of windows with shutters or plywood.
- If you do not have permanent hurricane shutters, install anchors for plywood (marine plywood is best) and predrill holes in precut half-inch outdoor plywood boards so that you can cover the windows of your home quickly. Mark which board fits which window. *Note:* Tape does not prevent windows from breaking, so taping windows is not recommended. Most homes destroyed during recent hurricanes had no window protection. When wind enters a home through broken windows, the pressure builds against the walls and can lift roofs, followed by collapsing walls.

- Install protection to the outside areas of sliding glass doors. Glass doors are as vulnerable as windows to breakage by wind-driven objects.
- Well ahead of time, buy any other items needed to board up windows and protect your home. When a hurricane threatens, supplies are quickly sold out at many stores. Stock may not be replenished until after the storm.
- Strengthen garage doors. Many houses are destroyed by hurricane winds that enter through damaged garage doors, lifting roofs, and destroying the remainder of the house.
- Have an engineer check your home and advise about ways to make it more resistant to hurricane winds. There are a variety of ways to protect your home. Professionals can advise you of engineering requirements, building permits or requirements of local planning and zoning departments to provide the most effective protection.
- Elevate coastal homes. Raising houses to a certain height will make them more resistant to hurricane-driven waters. There may be many local codes affecting how and where homes can be elevated. Meet with your emergency manager or planning and zoning official for a description of the process to have your home elevated. There may also be community funds available for such measures.
- If you live in a flood plain or are prone to flooding, also follow flood preparedness precautions. Hurricanes can bring great amounts of rain and frequently cause floods. Some hurricanes have dropped more than 10 inches of rain in just a few hours.

Media and Community Education Ideas

- Publish a special section in your local newspaper with emergency information on hurricanes. Localize the information by printing the phone number of local emergency services offices, the American Red Cross chapter, and the nearest hospitals.
- Provide hurricane tracking charts to local schools.
- Work with local emergency services and American Red Cross officials to prepare special reports to people with mobility impairments on what to do if an evacuation is ordered.
- At the beginning of each hurricane season, encourage the emergency response organizations to review community hurricane disaster plans.
- Publicize and promote a hurricane awareness week.
- Stage a simulated evacuation to show your community what can happen.
- Periodically inform your community of local public warning systems.

- Publish emergency evacuation routes.

What to Do During a Hurricane WATCH

- Continue listening regularly to a NOAA Weather Radio or local radio or television stations for updated information. Hurricanes can change direction, intensity, and speed very suddenly. What was a minor threat several hours ago can quickly escalate to a major threat.
- Listen to the advice of local officials, and evacuate if they tell you to do so. Avoid flooded roads and watch for washed-out bridges. Leaving an area that may be affected will help keep your family safe. Local officials may call for evacuation in specific areas at greatest risk in your community. Following the advice of local authorities is your safest protection. Local officials may close down certain roads, especially near the coast, when the outer effects of increasing wind and rain from a hurricane reach the coast.
- Prepare your property for high winds. Hurricane winds can blow large, heavy objects and send them crashing into homes. Anything not secured may become a deadly or damaging projectile.
    - Bring lawn furniture inside, as well as outdoor decorations or ornaments, trash cans, hanging plants, or anything else that can be picked up by the wind.
    - Make trees more wind resistant by removing diseased and damaged limbs, then strategically remove branches so that wind can blow through.
    - Secure building by closing and boarding up each window of your home. Remove outside antennas.
    - Moor boat securely or move it to a designated safe place. Use rope or chain to secure boat to trailer. Use tie-downs to anchor trailer to the ground or house.
- Fill your car's gas tank. If advised to evacuate, you may have to travel long distances or be caught in traffic, idling for long periods of time. Gas stations along the route may be closed.
- Stock up on prescription medications. Stores and pharmacies may be closed after the storm.
- Recheck manufactured home tie-downs. Manufactured homes may not be as affected by strong winds if they are tied down according to the manufacturer's instructions. Properly tied down homes are more likely to stay fixed to their foundations.
- Check your Disaster Supplies Kit. Some supplies may need to be replaced or restocked.

- Turn refrigerator and freezer to coldest setting. Open only when absolutely necessary and close quickly. Keeping the coldest air in will help perishables last much longer in the event of a power failure.
- Store valuables and personal papers in a safety deposit box in a waterproof container on the highest level of your home. Hurricanes leave much water damage inside homes. Historically, it is shown that protecting valuables in this manner will provide the best security.
- Turn off utilities if told to do so by authorities. Authorities may ask you to turn off water or electric utilities to prevent damage to your home or within the community. Most of the time they will tell you to leave the gas on because a professional is required to turn your gas back on, and it may be several weeks before you receive service.
- Turn off propane tanks. Propane tanks may be damaged or dislodged by strong winds or water. Turning them off reduces the fire potential if they are damaged by the storm.
- Unplug small appliances. Small appliances may be affected by electrical power surges that may occur as the storm approaches. Unplugging them reduces potential damage.
- Review evacuation plan. Make sure your planned route is the same as the currently recommended route. Sometimes roads may be closed or blocked, requiring a different route.
- Stay away from flood waters. If you come upon a flooded road, turn around and go another way. When you are caught on a flooded road and waters are rising rapidly around you, if you can do so safely, get out of your vehicle and climb to higher ground. Most hurricane-related deaths are caused by floods, and most flood fatalities are caused by people attempting to drive through water. The depth of water is not always obvious. The roadbed may be washed out under the water, and you could be stranded or trapped. Rapidly rising water may stall the engine, engulf the vehicle and its occupants, and sweep them away. Two feet of water will carry away most automobiles.

What to Do During a Hurricane WARNING

- Listen to a NOAA Weather Radio, or portable, battery-powered radio or television for updated information and official instructions. Hurricanes can change direction, intensity, and speed very suddenly. Continue listening for local information.
- If officials announce a hurricane warning, they may ask you to leave your home as soon as possible to be safe. Take your Disaster Supplies Kit and go to a shelter or your family contact's home. Call your check-in contact so someone will know where

you are going. Local officials advise leaving only if they truly believe your location is in danger. It is important to follow their instructions as soon as possible. Roads may become blocked and the storm can worsen, preventing safe escape. Having your disaster supplies will make you more comfortable while you are away from home.

- If you are not advised to evacuate, stay indoors, on the first floor away from windows, skylights and glass doors, even if they are covered. Stay on the floor least likely to be affected by strong winds and flood waters. A small interior room without windows on the first floor is usually the safest place. Have as many walls between you and the outside winds as possible. Sometimes strong winds and projectiles may tear hurricane shutters off, so stay away from windows even if they are covered. Lie on the floor under a table or other sturdy object. Being under a sturdy object will offer greater protection from falling objects.
- Close all interior doors. Secure and brace external doors. Closed doors will help prevent damaging hurricane winds from entering additional rooms.
- Have a supply of flashlights and extra batteries handy. Avoid using open flames (candles and kerosene lamps) as a source of light. Flashlights provide the safest emergency lighting source. Between 1984 and 1998, candle-related deaths from home fires following hurricanes were three times greater than the number of deaths related to the direct impact of the hurricane. Kerosene lamps require a great deal of ventilation and are not designed for indoor use.
- Store drinking water in clean bathtubs, sinks, plastic bottles, and cooking utensils. Public water supplies and wells may become contaminated, or electric pumps may be inoperative if power is lost. Survivors of community-wide disasters have said the individual's greatest need following the disaster is water.
- If power is lost, turn off major appliances to reduce the power "surge" when electricity is restored. When electricity is restored, the surge from many major appliances starting at the same time may cause damage or destroy the appliances. Turning off or unplugging major appliances will allow you to decide when it is best to turn them back on.
- If in a mobile home, check tie-downs and evacuate immediately. Historically, manufactured homes suffer the greatest amount of damage during hurricanes. Prior to 1994, most manufactured homes were not designed to withstand even moderate winds.
- Be aware that the calm "eye" is deceptive; the storm is not over. The worst part of the storm will happen once the eye passes over and the winds blow from the opposite direction. Trees, shrubs,

buildings, and other objects damaged by the first winds can be broken or destroyed by the second winds. The opposing winds begin suddenly, and have surprised and injured many people who ventured out during the eye.

- Watch out for flooding. Hurricanes and tropical storms often drop large amounts of rainfall and cause severe flooding, even when they are weakening or are no longer a named storm. "Weak" tropical storms are just as capable of producing heavy rainfall and flooding as major hurricanes.
- Be alert for tornadoes. Tornadoes can happen during and after a hurricane passes over. Remain indoors on a lower level, in the center of your home, in a closet or bathroom without windows. Going below ground, such as to a basement or storm cellar, increases your risk from flood.

What to Do if Evacuation Is Necessary

- Leave as soon as possible (if possible, in daylight). Avoid flooded roads and watch for washed-out bridges. Roads and bridges frequently become crowded and traffic moves slow. Evacuation will probably take longer than expected. Give yourself plenty of time.
- Secure your home by unplugging appliances and turning off electricity and the main water valve. This will reduce potential damage to your appliances (from power surges) and to your home.
- Tell someone outside of the storm area where you are going. Relatives and friends will be concerned about your safety. Letting someone know your travel plans will help relieve their fear and anxiety.
- If time permits, and you live in an identified surge zone or area prone to flooding, move furniture to a higher floor. Moving valuable furnishings helps reduce potential damage.
- Bring preassembled emergency supplies and warm protective clothing. People frequently arrive at shelters or hotels with nothing. Having these items will make you more comfortable in other locations.
- While shelters provide a safe place to stay and food, specialty items for infants and individuals on restricted diets may not be available. It may take several days until permission is given by local authorities to re-enter an evacuated area. Bring these items with you to a shelter:
  - First aid kit, manual, and prescription medications.
  - Baby food and diapers.
  - Cards, games, books.
  - Toiletries.

- Battery-powered radio and extra batteries.
- Flashlight (one per person) and extra batteries.
- Blankets or sleeping bags.
- Identification.
- Valuable papers (copies of insurance papers, passports, and other essential documents).

- Lock up your home and leave. There may be individuals evacuating after you, or returning before you. Police may be busy with hurricane-related emergencies and not able to patrol neighborhoods as usual. Lock your property as you normally would when leaving home.

What to Do After a Hurricane

- Continue listening to local radio or television stations or a NOAA Weather Radio for information and instructions. Access may be limited to some parts of the community, or roads may be blocked.
- If you evacuated, return home when local officials tell you it is safe. Local officials on the scene are your best source of information on accessible areas and passable roads.
- Stay alert for extended rainfall and subsequent flooding, even after the hurricane or tropical storm has weakened. Hurricanes may stall or change direction when they make landfall, or they may bring a lot of rain upriver, causing additional flood hazards for hours or days after the storm.
- Stay away from flood waters. Drive only if absolutely necessary and avoid flooded roads and washed-out bridges. Continue to follow all flood safety messages. Flood waters may last for days following a hurricane. If you come upon a flooded road, turn around and go another way. When you are caught on a flooded road and waters are rising rapidly around you, if you can safely get out of the car, do so immediately and climb to higher ground. Never try to walk, swim, or drive through such swift water. Most flood fatalities are caused by people attempting to drive through water or people playing in high water. If it is moving swiftly, even water six inches deep can sweep you off your feet, and two feet can carry away most automobiles.
- If you come upon a barricade, follow detour signs or turn around and go another way. Barricades are put up by local officials to protect people from unsafe roads. Driving around them can be a serious risk.
- Stay on firm ground. Moving water only six inches deep can sweep you off your feet. Standing water may be electrically charged from

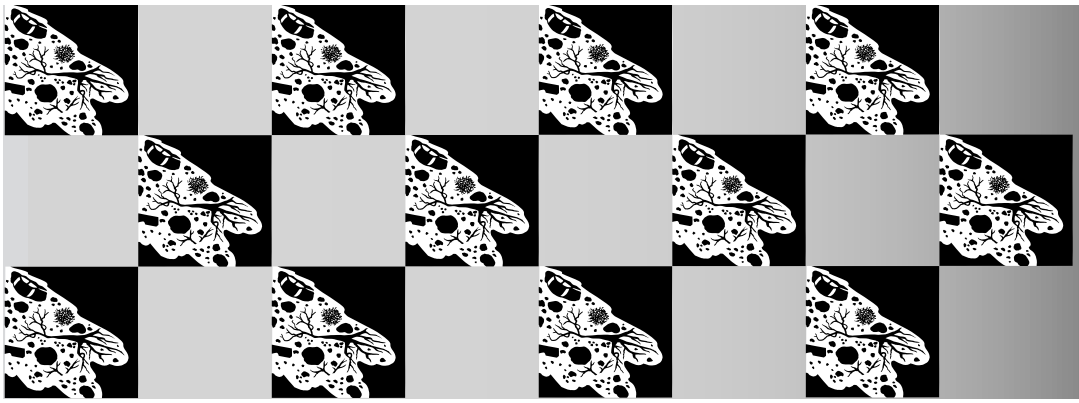
underground or downed power lines.

- Help injured or trapped persons. Give first aid where appropriate. Do not move seriously injured persons unless they are in immediate danger of further injury. Call for help.
- Help a neighbor who may require special assistance — infants, elderly people and people with disabilities. Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance in emergency situations.
- Avoid disaster areas. Your presence might hamper rescue and other emergency operations, and put you at further risk from the residual effects of floods, such as contaminated waters, crumbled roads, landslides, mudflows, and other hazards.
- Avoid loose or dangling power lines; immediately report them to the power company, police, or fire department. Reporting potential hazards will get the utilities turned off as quickly as possible, preventing further hazard and injury.
- Electrical equipment should be checked and dried before being returned to service. Call an electrician for advice before using electricity, which may have received water damage.
- Stay out of the building if water remains around the building. Flood waters often undermine foundations, causing buildings to sink, floors to crack, or walls to collapse.
- When entering buildings, use extreme caution. Hurricane-driven flood waters may have damaged buildings where you least expect it. Carefully watch every step you take.
    - Wear sturdy shoes. The most common injury following a disaster is cut feet.
    - Use battery-powered lanterns or flashlights when examining buildings. Battery-powered lighting is the safest and easiest, preventing fire hazard for the user, occupants, and building.
    - Examine walls, floors, doors, staircases, and windows to make sure that the building is not in danger of collapsing.
    - Inspect foundations for cracks or other damage. Cracks and damage to a foundation can render a building uninhabitable.
    - Look for fire hazards. There may be broken or leaking gas lines, flooded electrical circuits, or submerged furnaces or electrical appliances. Flammable or explosive materials may come from upstream. Fire is the most frequent hazard following floods.
    - Check for gas leaks. If you smell gas or hear a blowing or hissing

noise, open a window and quickly leave the building. Turn off the gas, using the outside main valve if you can, and call the gas company from a neighbor's home. If you turn off the gas for any reason, it must be turned back on by a professional.

  - Look for electrical system damage. If you see sparks or broken or frayed wires, or if you smell burning insulation, turn off the electricity at the main fuse box or circuit breaker. If you have to step in water to get to the fuse box or circuit breaker, call an electrician first for advice. Electrical equipment should be checked and dried before being returned to service.
  - Check for sewage and water line damage. If you suspect sewage lines are damaged, avoid using the toilets and call a plumber. If water pipes are damaged, contact the water company, and avoid using water from the tap. You can obtain safe water from undamaged water heaters or by melting ice cubes.
  - Watch out for animals, especially poisonous snakes, that may have come into buildings with the flood waters. Use a stick to poke through debris. Flood waters flush many animals and snakes out of their homes.
  - Watch for loose plaster, drywall, and ceilings that could fall.
  - Take pictures of the damage, both of the building and its contents, for insurance claims.

- Open windows and doors to ventilate and dry your home.
- Check refrigerated food for spoilage. If power was lost, some foods may be spoiled.
- Avoid drinking or preparing food with tap water until you are certain it is not contaminated. Hurricane-driven flood waters may have contaminated public water supplies or wells. Local officials should advise you on the safety of the drinking water. Undamaged water heaters or melted ice cubes can provide good sources of fresh drinking water.
- Pump out flooded basements gradually (about one-third of the water per day) to avoid structural damage. If the water is pumped out completely in a short period of time, pressure from water on the outside could cause basement walls to collapse.
- Service damaged septic tanks, cesspools, pits, and leaching systems as soon as possible. Damaged sewage systems are health hazards.
- Use the telephone only for emergency calls. Telephone lines are frequently overwhelmed in disaster situations. They need to be clear for emergency calls to get through.



Landslide and Debris Flow (Mudslide)

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/ CSREES, and USGS

Why talk about landslides?

Landslides are a serious geologic hazard common to almost every state in the United States. It is estimated that nationally they cause up to $2 billion in damages and from 25 to 50 deaths annually. Globally, landslides cause billions of dollars in damage and thousands of deaths and injuries each year. Individuals can take steps to reduce their personal risk. Know about the hazard potential where you live, take steps to reduce your risk, and practice preparedness plans.

What are landslides and debris flows, and what causes them?

Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. Gravity is the force driving landslide movement. Factors that allow the force of gravity to overcome the resistance of earth material to landslide movement include: saturation by water, steepening of slopes by erosion or construction, alternate freezing or thawing, earthquake shaking, and volcanic eruptions.

Landslides are a serious geologic hazard common to almost every state in the United States. It is estimated that nationally they cause up to $2 billion in damages and from 25 to 50 deaths annually.

Landslides are typically associated with periods of heavy rainfall or rapid snow melt and tend to worsen the effects of flooding that often accompanies these events. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides.

Debris flows, sometimes referred to as mudslides, mudflows, lahars, or

debris avalanches, are common types of fast-moving landslides. These flows generally occur during periods of intense rainfall or rapid snow melt. They usually start on steep hillsides as shallow landslides that liquefy and accelerate to speeds that are typically about 10 miles per hour, but can exceed 35 miles per hour. The consistency of debris flows ranges from watery mud to thick, rocky mud that can carry large items such as boulders, trees, and cars. Debris flows from many different sources can combine in channels, and their destructive power may be greatly increased. They continue flowing down hills and through channels, growing in volume with the addition of water, sand, mud, boulders, trees, and other materials. When the flows reach flatter ground, the debris spreads over a broad area, sometimes accumulating in thick deposits that can wreak havoc in developed areas.

Among the most destructive types of debris flows are those that accompany volcanic eruptions. A spectacular example in the United States was a massive debris flow resulting from the 1980 eruptions of Mount St. Helens, Washington. Areas near the bases of many volcanoes in the Cascade Mountain Range of California, Oregon, and Washington are at risk from the same types of flows during future volcanic eruptions.

Wildfires can also lead to destructive debris-flow activity. In July 1994, a severe wildfire swept Storm King Mountain, west of Glenwood Springs, Colorado, denuding the slopes of vegetation. Heavy rains on the mountain in September resulted in numerous debris flows, one of which blocked Interstate 70 and threatened to dam the Colorado River.

Learn whether landslides or debris flows have occurred in your area by contacting local officials, state geological surveys or departments of natural resources, and university departments of geology.

Awareness Information

Areas that are generally prone to landslide hazards include existing old landslides; the bases of steep slopes; the bases of drainage channels; and developed hillsides where leach-field septic systems are used.

Areas that are typically considered safe from landslides include areas that have not moved in the past; relatively flat-lying areas away from sudden changes in slope; and areas at the top or along ridges, set back from the tops of slopes.

Learn what to watch for prior to major landsliding. Look for patterns of storm-water drainage on slopes near your home, noting especially the places where runoff water converges, increasing flow over soil-covered slopes. Check hillsides around your home for any signs of land movement, such as small landslides or debris flows or progressively tilting trees.

Plan for a Landslide

Develop a Family Disaster Plan. Please see the "Family Disaster Plan" section for general family planning information. Develop landslide-specific planning. Learn about landslide risk in your area. Contact local officials, state geological surveys or departments of natural resources, and university departments of geology. Landslides occur where they have before, and in identifiable hazard locations. Ask for information on landslides in your area, specific information on areas vulnerable to landslides, and request a professional referral for a very detailed site analysis of your property, and corrective measures you can take, if necessary.

If you are at risk from landslides:

- Talk to your insurance agent. Debris flow may be covered by flood insurance policies from the National Flood Insurance Program (NFIP).
- Develop an evacuation plan. (See "Evacuation" in the "Family Disaster Plan" section.) You should know where to go if you have to leave. Trying to make plans at the last minute can be upsetting and create confusion.
- Discuss landslides and debris flow with your family. Everyone should know what to do in case all family members are not together. Discussing disaster ahead of time helps reduce fear and lets everyone know how to respond during a landslide or debris flow.

Assemble a Disaster Supplies Kit

Please see the "Disaster Supplies Kit" section for general supplies kit information. Landslide-specific supplies should include the following:

- Disaster Supplies Kit basics.
- Evacuation Supplies Kit.

How to Protect Your Property

- If your property is in a landslide-prone area, contract with a private consulting company specializing in earth movement for opinions and advice on landslide problems and on corrective measures you can take. Such companies would likely be those specializing in geotechnical engineering, structural engineering, or civil engineering. Local officials could possibly advise you as to the best kind of professional to contact in your area. Taking steps without consulting a professional could make your situation worse.
- Install flexible pipe fittings to avoid gas or water leaks. Flexible fittings will be less likely to break.

Media and Community Education Ideas

- In an area prone to landslides, publish a special newspaper section with emergency information on landslides and debris flows. Localize the information by including the phone numbers of local emergency services offices, the American Red Cross chapter, and hospitals.

- Report on what city and county governments are doing to reduce the possibility of landslides. Interview local officials about local land-use zoning regulations.
- Interview local officials and major insurers regarding the National Flood Insurance Program. Find out if debris flow is covered by flood insurance policies from the National Flood Insurance Program and contact your local emergency management office to learn more about the program.
- Work with local emergency services and American Red Cross officials to prepare special reports for people with mobility impairments on what to do if evacuation is ordered.
- Support your local government in efforts to develop and enforce land-use and building ordinances that regulate construction in areas susceptible to landslides and debris flows. Buildings should be located away from steep slopes, streams and rivers, intermittent-stream channels, and the mouths of mountain channels.

What to Do Before Intense Storms

- Become familiar with the land around you. Learn whether landslides and debris flows have occurred in your area by contacting local officials, state geological surveys or departments of natural resources, and university departments of geology. Knowing the land can help you assess your risk for danger.
- Watch the patterns of storm-water drainage on slopes near your home, and especially the places where runoff water converges, increasing flow over soil-covered slopes. Watch the hillsides around your home for any signs of land movement, such as small landslides or debris flows, or progressively tilting trees. Watching small changes could alert you to the potential of a greater landslide threat.

What to Do During Intense Storms

- Stay alert and awake. Many debris-flow fatalities occur when people are sleeping. Listen to a NOAA Weather Radio or portable, battery-powered radio or television for warnings of intense rainfall. Be aware that intense, short bursts of rain may be particularly dangerous, especially after longer periods of heavy rainfall and damp weather.
- If you are in areas susceptible to landslides and debris flows, consider leaving if it is safe to do so. Remember that driving during an intense storm can be hazardous. If you remain at home, move to a second story if possible. Staying out of the path of a landslide or debris flow saves lives.

- Listen for any unusual sounds that might indicate moving debris, such as trees cracking or boulders knocking together. A trickle of flowing or falling mud or debris may precede larger landslides. Moving debris can flow quickly and sometimes without warning.
- If you are near a stream or channel, be alert for any sudden increase or decrease in water flow and for a change from clear to muddy water. Such changes may indicate landslide activity upstream, so be prepared to move quickly. Don't delay! Save yourself, not your belongings.
- Be especially alert when driving. Embankments along roadsides are particularly susceptible to landslides. Watch the road for collapsed pavement, mud, fallen rocks, and other indications of possible debris flows.

What to Do if You Suspect Imminent Landslide Danger

- Contact your local fire, police, or public works department. Local officials are the best persons able to assess potential danger.
- Inform affected neighbors. Your neighbors may not be aware of potential hazards. Advising them of a potential threat may help save lives. Help neighbors who may need assistance to evacuate.
- Evacuate. Getting out of the path of a landslide or debris flow is your best protection.

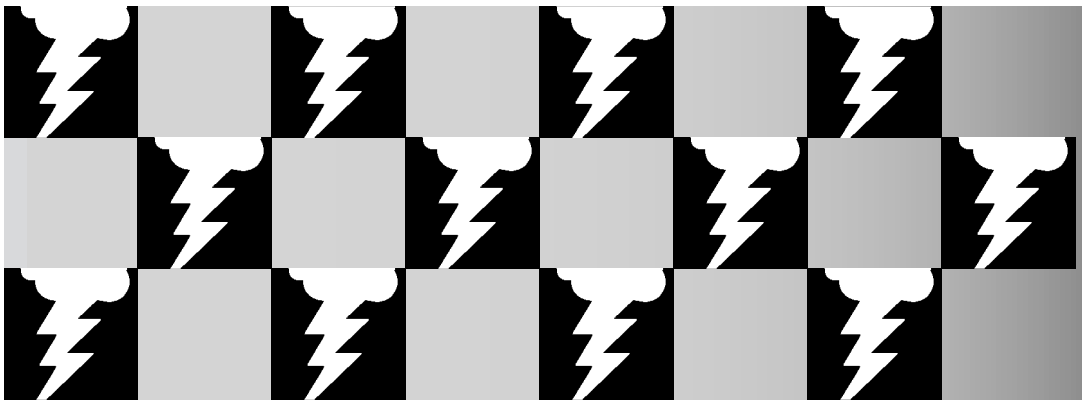
What to Do During a Landslide

- Quickly move out of the path of the landslide or debris flow. Moving away from the path of the flow to a stable area will reduce your risk.
- If escape is not possible, curl into a tight ball and protect your head. A tight ball will provide the best protection for your body.

What to Do After a Landslide

- Stay away from the slide area. There may be danger of additional slides.
- Check for injured and trapped persons near the slide, without entering the direct slide area. Direct rescuers to their locations.
- Help a neighbor who may require special assistance — infants, elderly people, and people with disabilities. Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance in emergency situations.

- Listen to local radio or television stations for the latest emergency information.
- Watch for flooding, which may occur after a landslide or debris flow. Floods sometimes follow landslides and debris flows because they may both be started by the same event.
- Look for and report broken utility lines to appropriate authorities. Reporting potential hazards will get the utilities turned off as quickly as possible, preventing further hazard and injury.
- Check the building foundation, chimney, and surrounding land for damage. Damage to foundations, chimneys, or surrounding land may help you assess the safety of the area.
- Replant damaged ground as soon as possible since erosion caused by loss of ground cover can lead to flash flooding.
- Seek the advice of a geotechnical expert for evaluating landslide hazards or designing corrective techniques to reduce landslide risk. A professional will be able to advise you of the best ways to prevent or reduce landslide risk, without creating further hazard.



Severe Thunderstorm

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/CSREES, and USGS

Why talk about severe thunderstorms?

Despite their small size, all thunderstorms are dangerous. Every thunderstorm produces lightning, which kills more people each year than tornadoes. Heavy rain from thunderstorms can lead to flash flooding. Strong winds, hail, and tornadoes are also dangers associated with some thunderstorms.

Thunderstorms affect relatively small areas when compared with hurricanes and winter storms. The typical thunderstorm is 15 miles in diameter and lasts an average of 20 to 30 minutes. Of the estimated 100,000 thunderstorms that occur each year in the United States, only about 10 percent are classified as severe.

What are severe thunderstorms, and what causes them?

The National Weather Service (NWS) considers a thunderstorm severe if it produces hail at least three-quarters of an inch in diameter, has winds of 58 miles per hour or higher, or produces a tornado. When a severe thunderstorm WARNING is issued, review what actions to take under a tornado warning or a flash flood warning.

All thunderstorms are dangerous. Every thunderstorm produces lightning, which kills more people each year than tornadoes. Heavy rain from thunderstorms can lead to flash flooding.

Thunderstorms may occur singly, in clusters, or in lines. Some of the most severe weather occurs when a single thunderstorm affects one location for an extended time. Lightning is a major threat during a thunderstorm. It is the lightning that produces thunder in a thunderstorm. Lightning is very unpredictable, which increases the risk to individuals and property. In the United States, 75 to 100 people are killed each year by lightning, although most lightning victims do survive. Persons struck by lightning often report a variety of long-term, debilitating symptoms, including memory loss, attention

deficits, sleep disorders, numbness, dizziness, stiffness in joints, irritability, fatigue, weakness, muscle spasms, depression, and an inability to sit for long. It is a myth that lightning never strikes the same place twice. In fact, lightning will strike several times in the same place in the course of one discharge.

Learn more about severe thunderstorm risk in your area. Contact your local emergency management office, National Weather Service (NWS) office, or American Red Cross chapter.

Awareness Information

- A National Weather Service WATCH is a message indicating that conditions favor the occurrence of a certain type of hazardous weather. For example, a severe thunderstorm watch means that a severe thunderstorm is expected in the next six hours or so within an area approximately 120 to 150 miles wide and 300 to 400 miles long (36,000 to 60,000 square miles). The NWS Storm Prediction Center issues such watches. Local NWS forecast offices issue other watches (flash flood, winter weather, etc.) 12 to 36 hours in advance of a possible hazardous-weather or flooding event. Each local forecast office usually covers a state or a portion of a state.
- An NWS WARNING indicates that a hazardous event is occurring or is imminent in about 30 minutes to an hour. Local NWS forecast offices issue warnings on a county-by-county basis.

Lightning often strikes outside of heavy rain and may occur as far as 10 miles away from any rainfall. “Heat lightning” is actually lightning from a thunderstorm too far away for thunder to be heard. However, the storm may be moving in your direction.

You are in danger from lightning if you can hear thunder. Because light travels so much faster than sound, lightning flashes can sometimes be seen long before the resulting thunder is heard. When the lightning and thunder occur very close to one another, the lightning is striking nearby. To estimate the number of miles you are from a thunderstorm, count the number of seconds between a flash of lightning and the next clap of thunder. Divide this number by five.

Many strong thunderstorms produce hail. Large hail, or flying glass it may have broken, can injure people and animals. Hail can be smaller than a pea, or as large as a softball, and can be very destructive to automobiles, glass surfaces (skylights and windows), roofs, plants, and crops. In a hailstorm, take cover immediately. Pets and livestock are particularly vulnerable to hail, so bring animals into shelter before storms begin.

Downbursts and straight-line winds associated with thunderstorms can produce winds 100 to 150 miles per hour, enough to flip cars, vans, and semitrucks. The resulting damage can equal the damage of most tornadoes. If a severe thunderstorm warning is issued,

take shelter the same way you would if a tornado were approaching your area. Leave structures that are susceptible to being blown over in high winds, such as a mobile home.

Plan for a Thunderstorm

Develop a Family Disaster Plan. Please see the "Family Disaster Plan" section for general family planning information. Severe thunderstorm specific planning should include the following:

- Learn about your area's severe thunderstorm risk. Severe thunderstorms can occur year-round and at any hour. Contact your local emergency management office, local National Weather Service office, or American Red Cross chapter for more information.
- Discuss how you would know if a thunderstorm may produce a tornado. Tornadoes develop from severe thunderstorms along and ahead of cold fronts. (See the "Tornado" section for more information.)
- Pick a "safe place" in your home where family members can gather during a thunderstorm. This should be a place where there are no windows, skylights, or glass doors, which could be broken by strong winds or hail, causing damage or injury. Severe thunderstorms do, at times, produce tornadoes.
- In preparation for possible tornado warnings, consider making your severe thunderstorm "safe place" on the lowest floor of the building, near your tornado safe space.
- Learn how to squat low to the ground. Make yourself the smallest target possible for lightning and minimize contact with the ground. Lightning current often enters a victim through the ground rather than by a direct overhead strike. Assume a crouched position on the ground with only the balls of the feet touching the ground, place your hands on your knees, and lower your head. Minimize your body's surface area, and minimize contact with the ground.
- Discuss how you would be warned of an approaching thunderstorm. Different communities have different ways of providing warnings. Many communities have sirens intended for outdoor warning purposes. Use a NOAA Weather Radio with a tone-alert feature to keep you aware of watches and warnings while you are indoors. Learn about your community's warning system. Make sure all family members know the name of the county or parish where you live or are traveling, because severe thunderstorm watches and warnings are issued for counties or parishes.
- Get training. Take an American Red Cross first aid and CPR course to learn how to treat burns and how to give rescue breathing and

administer CPR. Everyone should know how to respond, because severe thunderstorms can strike almost anywhere at anytime.

- Discuss severe thunderstorms with your family. Everyone should know what to do in case all family members are not together. Discussing disaster ahead of time helps reduce fear and lets everyone know how to respond during a severe thunderstorm.

What to Tell Children

The sound of thunder can be especially frightening for young children. Take the "scariness" away by teaching them what to expect during a thunderstorm and how to be safe.

- Postpone outdoor activities if thunderstorms are likely. Many people take shelter from the rain, but most people struck by lightning are not in the rain! Postponing activities is your best way to avoid being caught in a dangerous situation.
- If you see or hear a thunderstorm coming, go inside a sturdy building or car. Sturdy buildings are the safest place to be. If no building is nearby, a hard-top vehicle will offer some protection. Keep car windows closed and avoid convertibles. Rubber-soled shoes and rubber tires provide no protection from lightning. However, 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.
- If you can't get inside, or if you feel your hair stand on end, which means lightning is about to strike, hurry to a low, open space *immediately*. Crouch down on the balls of your feet, place your hands on your knees and lower your head. Make yourself the smallest target possible and minimize contact with the ground.
- Practice the "crouch down" position. Show children how to practice squatting low to the ground to be the smallest target possible for lightning in case they get caught outside in a thunderstorm. Show them how to place their hands on their knees and lower their head, crouching on the balls of their feet.
- Stay away from tall things like trees, towers, fences, telephone lines, or power lines. They attract lightning. Never stand underneath a single large tree out in the open, because lightning usually strikes the highest point in an area.
- Stay away from metal things that lightning may strike, such as umbrellas, baseball bats, fishing rods, camping equipment, and bicycles. Lightning is attracted to metal and poles or rods.
- If you are boating or swimming, get to land immediately. Stay away from rivers, lakes, and other bodies of water and get off the

beach. The saturated sand conducts electricity very well. Water is an excellent conductor of electricity. When lightning strikes nearby, the electrical charge can travel through the water. Each year people are killed by nearby lightning strikes while in or on the water or on the beach.

Assemble a Disaster Supplies Kit

Please see the section "Disaster Supplies Kit" for general supplies kit information. Severe thunderstorm–specific supplies should include the Disaster Supplies Kit basics.

- Turn off the air conditioner and television, and stay off the phone until the storm is over. Lightning can cause electric appliances, including televisions and telephones, to become dangerous during a thunderstorm.
- Stay away from running water inside the house; avoid washing your hands or taking a bath or shower. Electricity from lightning has been known to come inside through plumbing.

Protect Your Property

- Make a list of items to bring inside in the event of a storm. Having a list will help you remember things that may be broken or blown away in strong winds.
- Keep trees and shrubbery trimmed. Make trees more wind resistant by removing diseased or damaged limbs, then strategically remove branches so that wind can blow through. Strong winds frequently break weak limbs and hurl them at great speed, causing damage or injury when they hit.
- Remove any debris or loose items in your yard. Branches and firewood may become missiles in strong winds.
- Consider installing permanent shutters to cover windows. Shutters can be closed quickly and provide the safest protection for windows.
- Install lightning rods. Lightning rods will carry the electrical charge of lightning bolts safely to the ground, greatly reducing the chance of a lightning-induced fire.
- Insure crops against financial loss from storm damage through the Federal Crop Insurance Corporation of the U.S. Department of Agriculture. If applicable, it is recommended you obtain separate specific insurance to cover your crops. Losses are not covered through usual insurance policies. Each year severe storms cause millions of dollars in crop damage. Hail, in particular, has been known to wipe out entire fields.

Media and Community Education Ideas

- Publish a special section in your local newspaper with emergency information about thunderstorms and lightning. Place special emphasis on what people should do if they are caught outside. Localize the information by printing the phone numbers of local emergency service offices, the American Red Cross chapter, and the nearest hospitals.
- Interview officials with the U.S. Department of Agriculture about the Federal Crop Insurance Corporation.
- Periodically inform your community of local public warning systems.
- Have your meteorologist speak to elementary schools and youth groups about the dangers of thunderstorms, lightning, and hail.
- Interview a representative of the American Red Cross about giving first aid to people who have been struck by lightning.
- Interview agents from various insurance companies about what homeowner's insurance does and does not cover in severe weather (flooding, fallen trees creating no structural damage, etc.).

What to Do Before a Thunderstorm

- Use a NOAA Weather Radio with a tone-alert feature to keep you informed of watches and warnings issued in your area. The tone-alert feature will automatically alert you when a watch or warning is issued.
- If planning a trip or extended period of time outdoors, listen to the latest forecasts and take necessary action if threatening weather is possible. Knowing what weather could happen helps you be prepared to respond if necessary. Having a raincoat, umbrella, and disaster supplies kit available will make it easier to deal with severe weather if it occurs.
- Postpone outdoor activities if thunderstorms are imminent. Coaches of outdoor sports teams should have a NOAA Weather Radio with a tone-alert feature during practice sessions and games. Threatening weather can endanger athletes, staff, and spectators. Many people take shelter from the rain, but most people struck by lightning are not in the rain! Postponing activities is your best way to avoid being caught in a dangerous situation.
- Keep an eye on the sky. Pay attention to weather clues around you that may warn of imminent danger. Look for darkening skies, flashes of lightning, or increasing wind, which may be signs of an approaching thunderstorm.
- Stay aware of your surroundings. Look for places you might go should severe weather threaten.

- Listen for the sound of thunder. If you can hear thunder, you are close enough to the storm to be struck by lightning. Go to safe shelter immediately.

What to Do During a Severe Thunderstorm WATCH

- Listen to a NOAA Weather Radio, or local radio or television stations for updated information. Local authorities will provide you with the best information for your particular situation.
- Avoid natural lightning rods such as golf clubs, fishing poles, tractors, bicycles, and camping equipment. Lightning is attracted to metal and poles or rods.
- Be prepared to seek shelter if a severe thunderstorm approaches. A sturdy building is the safest place to be during a severe thunderstorm. Avoid unprotected gazebos, rain or picnic shelters, golf carts, baseball dugouts and bleachers. While many people take shelter from rain in these locations, they are often isolated structures in otherwise open areas, and, therefore, a target for lightning. In addition, gazebos and picnic shelters are often poorly anchored and subject to being uprooted and blown around in strong thunderstorm winds. They also offer little protection from large hail.

If you perceive a severe thunderstorm approaching:

- Secure outdoor objects such as lawn furniture that could blow away or cause damage or injury. Take light objects inside.
- Shutter windows securely and brace outside doors. This will help protect your house from damaging winds or flying debris.
- Avoid electrical equipment and telephones. Lightning could follow the wire. Television sets are particularly dangerous at this time.
- Avoid bathtubs, water faucets, and sinks because metal pipes can transmit electricity.

What to Do During a Severe Thunderstorm WARNING

Listen to a NOAA Weather Radio or a battery-powered radio or television for updated emergency information. If the power goes out, you still will have access to important information.

What to Do at Home During a Thunderstorm WARNING

- Draw blinds and shades over windows. If windows break due to objects blown by the wind or large hail, the shades will help prevent glass from shattering into your home.
- Unplug appliances. Avoid using the telephone or any electrical appliances. If lightning strikes, telephone lines and metal pipes can conduct

electricity. Leaving electric lights on, however, does not increase the chances of your home being struck by lightning.

- Avoid taking a bath or shower, or running water for any other purpose. Metal pipes and plumbing can conduct electricity if struck by lightning.
- Turn off the air conditioner. Power surges from lightning can overload the compressor, resulting in a costly repair job.

What to Do if You Are Outside and a Severe Thunderstorm Is Approaching

- If you are boating or swimming, get to land, get off the beach, and find shelter immediately. Stay away from rivers, lakes, and other bodies of water. Water is an excellent conductor of electricity. When lightning strikes nearby, the electrical charge can travel through the water. Each year, numbers of people are killed by nearby lightning strikes while in or on the water.
- Take shelter in substantial, permanent, enclosed structures, such as reinforced buildings. Sturdy buildings are the safest place to be. Avoid unprotected gazebos, rain or picnic shelters, golf carts, baseball dugouts and bleachers. While many people take shelter from rain in these locations, they are often isolated structures in otherwise open areas, and, therefore, a target for lightning. In addition, gazebos and picnic shelters are often poorly anchored and subject to being uprooted and blown around in strong thunderstorm winds. They also offer little protection from large hail.
- If there are no reinforced buildings in sight, take shelter in a car. Keep car windows closed and avoid convertibles. Rubber-soled shoes and rubber tires provide no protection from lightning. However, 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.
- If you are in the woods, find an area protected by a low clump of trees. Never stand underneath a single large tree in the open. Be aware of the potential for flooding in low-lying areas.
- As a last resort and if no structure is available, go to a low-lying, open place away from trees, poles, or metal objects. Make sure the place you pick is not subject to flooding. Have as little contact with the ground as possible. Squat low to the ground. Place your hands on your knees with your head between them. Make yourself the smallest target possible. Do not lie flat on the ground — this will make you a larger target.

- Avoid tall structures such as towers, tall trees, fences, telephone lines, and power lines. Lightning strikes the tallest objects in an area.
- Stay away from natural lightning rods, such as golf clubs, tractors, fishing rods, bicycles, and camping equipment. Lightning is attracted to metal and poles or rods.
- If you are isolated in a level field or prairie and you feel your hair stand on end (which indicates that lightning is about to strike), drop to your knees and bend forward, putting your hands on your knees. Crouch on the balls of your feet. Do not lie flat on the ground. The electrical build-up just before lightning strikes will cause your hair to stand on end. Make yourself the smallest target possible and minimize contact with the ground.

What to Do While Driving During a Thunderstorm and Heavy Rain

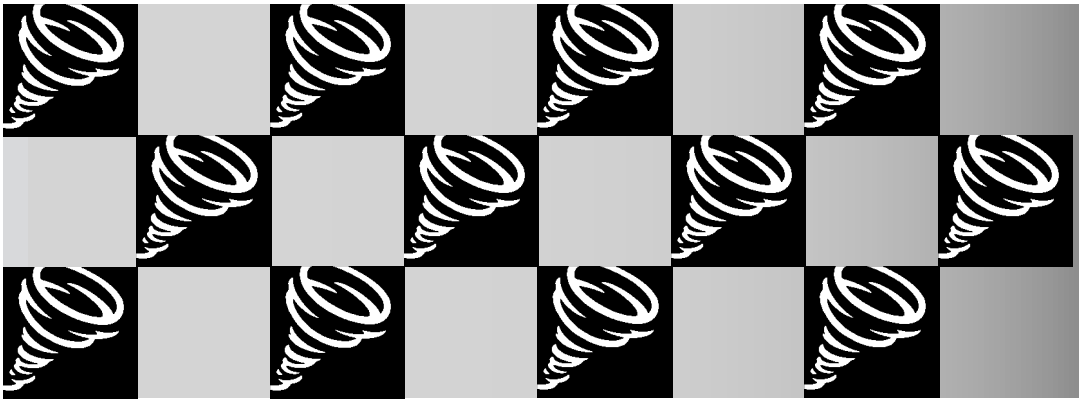
- Pull safely onto the shoulder of the road and stop, making sure you are away from any trees or other tall objects that could fall on the vehicle. Stay in the car and turn on the emergency flashers until the heavy rains subside. Heavy rains produced by thunderstorms can greatly reduce visibility. Vehicles will provide better protection from lightning than being out in the open. Emergency flashers will alert other drivers with limited visibility that you have stopped. Keep car windows closed.
- Avoid contact with metal or conducting surfaces outside or inside the vehicle. Lightning that strikes nearby can travel through wet ground to your car. The steel frame of a hard-topped vehicle provides increased protection if you are not touching metal. Rubber tires provide no protection from lightning. Avoid contact with potential conductors to reduce your chance of being shocked. Although you may be injured if lightning strikes your car, you are much safer inside a vehicle than outside.
- Avoid flooded roadways. Most flood fatalities are caused by people attempting to drive through water, or people playing in high water. The depth of water is not always obvious. The roadbed may be washed out under the water, and you could be stranded or trapped. Rapidly rising water may stall the engine, engulf the vehicle and its occupants, and sweep them away. Look out for flooding at highway dips, bridges, and low areas. Two feet of water will carry away most automobiles.

What to Do After a Thunderstorm

- Continue listening to local radio or television stations or a NOAA Weather Radio for updated information and instructions. Access may be limited to some parts of the community, or roads may be blocked.
- Help a neighbor who may require special assistance — infants, elderly people, and people with disabilities. Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance caring for several people in emergency situations.
- Stay away from storm-damaged areas. You may be putting yourself at further risk from the residual effects of severe thunderstorms.
- Watch out for fallen power lines and report them immediately. Reporting potential hazards will get the utilities turned off as quickly as possible, preventing further hazard and injury.

What to Do if Someone Is Struck by Lightning

- Call for help. Get someone to dial 9-1-1 or your local Emergency Medical Services (EMS) number. Medical attention is needed as quickly as possible.
- Give first aid. If breathing has stopped, begin rescue breathing. If the heart has stopped beating, a trained person should give CPR. If the person has a pulse and is breathing, look and care for other possible injuries.
- Check for burns in two places. The injured person has received an electrical shock and may be burned, both where they were struck and where the electricity left their body. Being struck by lightning can also cause nervous system damage, broken bones, and loss of hearing or eyesight. People struck by lightning carry no electrical charge that can shock other people, and they can be handled safely.



Tornado

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/ CSREES, and USGS

Why talk about tornadoes?

Tornadoes have been reported in every state, and though they generally occur during spring and summer, they can happen any time of the year. While tornadoes can occur at any time of the day or night, they are most likely to occur between 3:00 and 9:00 p.m. There are no areas immune to tornadoes; they have been reported in mountains and valleys, over deserts and swamps, from the Gulf Coast into Canada, in Hawaii and even Alaska. Regardless of the location or time of year, if conditions are right, a tornado can happen. Over 1,000 tornadoes are reported annually nationwide, and as our tornado detection systems improve, more are being reported each year. However, sometimes tornadoes will develop in areas in which no tornado watch or warning is in effect, so stay alert for changing weather conditions.

What are tornadoes, and what causes them?

A tornado is a violently rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes have rotating winds of 250 miles per hour or more. They are capable of causing extreme destruction, including uprooting trees and well-made structures, and turning normally harmless objects into deadly missiles. Most tornadoes are just a few dozen yards wide and only briefly touch down, but highly destructive violent tornadoes may carve out paths over a mile wide and more than 50 miles long. Although violent tornadoes comprise only 2 percent of all tornadoes, they are responsible for nearly 70 percent of tornado-related fatalities.

Over 1,000 tornadoes are reported annually nationwide, and as our tornado detection systems improve, more are being reported each year.

Tornadoes develop from severe thunderstorms in warm, moist, unstable air along and ahead of cold fronts. Such thunderstorms also may generate large hail and damaging winds. When intense springtime storm systems produce large, persistent areas that support tornado development, major outbreaks can occur. During the late spring, tornadic thunderstorms can develop in the southern High Plains along a "dry line," the interface between warm, moist air to the east and hot, dry air to the west. From the front range of the Rocky Mountains southward into the Texas Panhandle, slope flow of unstable air can cause tornadic thunderstorms to develop. While generally smaller and not as frequent, tornadoes occurring west of the Rocky Mountains of the United States also cause damage and threaten lives annually.

Landfalling tropical storms and hurricanes also generate tornadoes. Such tornadoes are most common to the right and ahead of the storm path or the storm center as it comes ashore. In 1967, Hurricane Beulah produced 148 tornadoes as it made landfall in south Texas.

While tornadoes can be highly destructive and are potentially deadly, timely precautions can save lives and reduce property damage. During active weather, stay alert of the forecast by listening to radio or television or by using a NOAA Weather Radio. Contact your local National Weather Service (NWS) office, emergency management agency, or American Red Cross chapter for more information about your risk from tornadoes.

Awareness Information

- A National Weather Service WATCH is a message indicating that conditions favor the occurrence of a certain type of hazardous weather. For example, a severe thunderstorm watch means that a severe thunderstorm is expected in the next six hours or so within an area approximately 120 to 150 miles wide and 300 to 400 miles long (36,000 to 60,000 square miles). The NWS Storm Prediction Center issues such watches. Local NWS forecast offices issue other watches (flash flood, winter weather, etc.) 12 to 36 hours in advance of a possible hazardous-weather or flooding event. Each local forecast office usually covers a state or a portion of a state.
- An NWS WARNING indicates that a hazardous event is occurring or is imminent in about 30 minutes to an hour. Local NWS forecast offices issue warnings on a county-by-county basis.

Tornadoes may appear nearly transparent until dust and debris are picked up. Stay alert for high winds even if you do not "see" a tornado.

Tornadoes often occur when it is not raining. In fact, in the Great Plains and other semiarid regions, that scenario is the rule rather than the exception. Tornadoes are associated with a powerful updraft, so rain does

not fall in or next to a tornado. Very large hail, however, does fall in the immediate area of the tornado. In humid environments, rain often tends to wrap around the tornado, being pulled from the main precipitation area around the outside of the rotating updraft. The rain could make it difficult to see the tornado.

Waterspouts are weak tornadoes that form over warm water and are most common along the Gulf Coast and southeastern states. In the western United States, waterspouts occur with cold late fall or late winter storms, during a time when you least expect tornado development. Waterspouts, which are tornadoes over a body of water, occasionally move inland becoming tornadoes and causing damage and injuries.

Damage happens when wind gets inside a home through a broken window, door, or damaged roof. Keep windows closed. Houses do not explode due to air pressure differences. Stay away from windows during severe storms. Flying debris could shatter the glass and cause injury.

It used to be advised to go to the southwest corner for safety; however, the southwest corner of a house is no safer than any other corner. Historical information has shown that any corner on the lowest level away from windows is as safe as any other corner. If tornado winds enter the room, debris has a tendency to collect in corners. When selecting a tornado "safe place," look for a place on the lowest level and away from windows, preferably in a small room (closet or bathroom) in the center of the house. Closer walls will help provide more support to the roof, and each wall between you and the outside will provide further protection.

Folklore passed down through the generations used to advise opening windows in case of a tornado because air pressure differences would cause a house to explode. This information is not true. Air pressure differences in a tornado are not strong enough to cause a house to explode; houses are damaged by the violent winds associated with a tornado and from the debris blown at high velocities by tornado winds.

Folklore also used to advise that if you are driving and a tornado is suspected or sighted, you should turn and drive at right angles to the storm. This advice is not recommended because tornadoes do not necessarily travel in straight lines; you cannot always tell the direction the storm is coming from; the road you turn onto may curve and head into the storm, rather than away from it; and there may be more than one tornado associated with a strong storm system, but you may not see it because visibility is diminished by heavy rain and wind-blown debris. The safest thing to do is go to a nearby sturdy building and go inside to an area on the lowest level, without windows. If a sturdy building is not available, then get out of the vehicle and lay down in a low spot on the ground not subject to flooding, protecting the head and neck.

Plan for a Tornado

Develop a Family Disaster Plan. Please see the "Family Disaster Plan" section for general family planning information. Tornado–specific planning should include the following:

- Learn about your tornado risk. While severe tornadoes are more frequent in the Plains States, tornadoes have happened in every state. Contact your local emergency management office, local National Weather Service office, or American Red Cross chapter for more information on tornadoes.
- Pick a safe place in your home where family members could gather during a tornado. The safest place to be is underground, or as low to the ground as possible, and away from all windows. If you have a basement, make it your safe place. If you do not have a basement, consider an interior hallway or room on the lowest floor. Putting as many walls as you can between you and the outside will provide additional protection. Less than 2 percent of all tornadoes are powerful enough to completely destroy a sturdy building. Make sure there are no windows or glass doors in your safe place and keep this place uncluttered.
- Consider having your tornado safe place reinforced. Additional reinforcement will add more protection from the damaging effects of tornado winds. Get more information from FEMA about building a tornado safe room. (See "Resources" section.)
- If you are in a high-rise building, pick a place in a hallway in the center of the building. You may not have enough time to go to the lowest floor. Center hallways are often structurally the most reinforced part of a building.
- If you live in a mobile home, choose a safe place in a nearby sturdy building. A sturdy building provides greater protection. If your mobile home park has a designated shelter, make it your safe place. Mobile homes are much more vulnerable to strong winds than site-built structures. Prior to 1994, most manufactured homes were not designed to withstand even moderate winds.
- Discuss how you would be warned of an approaching tornado. Different communities have different ways of providing warnings. Many communities have sirens intended for outdoor warning purposes. Use a NOAA Weather Radio with a tone-alert feature to keep you aware of watches and warnings while you are indoors. Learn about your community's warning system. Make sure all family members know the name of the county or parish where you live or are traveling, because tornado watches and warnings are issued for a county or parish by name.
- Learn about your community's warning system. Different commu-

nities have different ways of providing warnings. Many communities have sirens intended for outdoor warning purposes. Use a NOAA Weather Radio with a tone-alert feature to keep you aware of watches and warnings while you are indoors.

- Conduct periodic tornado drills, so everyone remembers what to do when a tornado is approaching. Practice having everyone in the family go to your designated area in response to a tornado threat. Practicing your plan makes the appropriate response more of a reaction, requiring less thinking time during an actual emergency situation.
- Check with your work and your children's schools and day care centers to learn tornado emergency plans. Every building has different safe places. It is important to know where they are and how to get there in an emergency.
- Discuss tornadoes with your family. Everyone should know what to do in case all family members are not together. Discussing disaster ahead of time helps reduce fear and lets everyone know how to respond during a tornado.

What to Tell Children

- Find safe places in your home and classroom. Make sure these places are away from windows and tall furniture that could tip over. In your safe place, get under something sturdy, or use a large, hard-cover book to help protect your head and neck from flying or falling objects. Locate safe places outside in case you are not able to go inside. Frequently, children in schools are told to move to the inner hallways away from windows. Children need to know that a tornado safe place is not the same as a fire meeting place.
- Wherever you are, if you hear or see a tornado coming, take cover right away. Tornadoes can move quickly, blowing objects at very high speeds, even if they are a distance away. Protect yourself from flying debris by taking cover immediately.
- If you're in a house or apartment building and a tornado threatens, go to the lowest level — a basement or storm cellar if possible. Once on the lowest level, go to the middle of the building away from windows, into a bathroom or closet if possible. The safest place to be is under the ground, or as low to the ground as possible, and away from all windows. If you have a basement, make it your safe place. If you do not have a basement, consider an interior hallway or room on the lowest floor. Putting as many walls as you can between you and the outside will provide additional protection. Make sure there are no windows or glass doors in your safe place and keep this place uncluttered.

- Get under something sturdy, such as a heavy table, hold on and stay there until the danger has passed. Being under something heavy will help protect you from falling objects. If tornado wind enters the room and the object moves, holding on with one hand will help you move with it, keeping you protected.
- Use your other arm and hand to protect your head and neck from falling or flying objects. Your head and neck are more easily injured than other parts of your body. Protect them as much as you can.
- If you're outside in a car or in a mobile home, go immediately to the basement of a nearby sturdy building. Sturdy buildings are the safest place to be. Tornado winds can blow large objects, including cars, hundreds of feet away. Tornadoes can change direction quickly and can lift up a car or truck and toss it through the air. Never try to out-drive a tornado. Mobile homes are particularly vulnerable. A mobile home can overturn very easily even if precautions have been taken to tie down the unit.
- If there is no building nearby, lie flat in a low spot. Use your arms and hands to protect your head. Tornadoes cause a lot of debris to be blown at very high speeds, and you can be hurt by this debris if it hits you. Dangerous flying debris can be blown under highway overpasses and bridges, or weaker overpasses and bridges could be destroyed. You will be safer lying flat in a low-lying area where wind and debris will blow above you. Tornadoes come from severe thunderstorms, which can produce a lot of rain. If you see quickly rising water or flood water coming towards you, move to another spot.

How to Protect Your Property

- Make a list of items to bring inside in the event of a storm. Having a list will help you remember things that may be broken or blown away in strong winds.
- Keep trees and shrubbery trimmed. Make trees more wind resistant by removing diseased or damaged limbs, then strategically remove branches so that wind can blow through. Strong winds frequently break weak limbs and hurl them at great speed, causing damage or injury when they hit. Debris collection services may not be operating just before a storm, so it is best to do this well in advance of approaching storms.
- Remove any debris or loose items in your yard. Branches and firewood may become missiles in strong winds.
- Consider installing permanent shutters to cover windows. Shutters can be closed quickly and provide the safest protection for windows.

Assemble a Disaster Supplies Kit

Please see the "Disaster Supplies Kit" section for general supplies kit information. Tornado-specific supplies should include the following:

- A highway map to follow storm movement from weather bulletins.
- Disaster Supplies Kit basics.

- Strengthen garage doors. Garage doors are often damaged or destroyed by flying debris, allowing strong winds to enter. As winds apply pressure to the walls, the roof can be lifted off, and the rest of the house can easily follow.

Media and Community Education Ideas

- Publish a special section in your local newspaper with emergency information about tornadoes. Localize the information by printing the phone numbers of local emergency services offices, the American Red Cross chapter, and the nearest hospitals.
- Periodically inform your community of local public warning systems.
- Sponsor a "Helping Your Neighbors" program at your local schools to encourage children to think of those persons who require special assistance, such as elderly people, infants, or people with disabilities.
- Conduct a series on how to protect yourself during a tornado in case you are at home, in a car, at the office, or outside.
- Interview local officials about what people living in mobile home parks should do if a tornado warning is issued.

What to Do Before a Tornado

- Use a NOAA Weather Radio with a tone-alert feature to keep you informed of watches and warnings issued in your area. The tone-alert feature will automatically alert you when a watch or warning is issued.
- If planning a trip or extended period of time outdoors, listen to the latest forecasts and take necessary action if threatening weather is possible. Knowing what weather could happen helps you be prepared to respond if necessary. Having a raincoat, umbrella, and disaster supplies kit available will make it easier to deal with severe weather if it occurs.
- Watch for tornado danger signs. Tornadoes may happen so quickly warnings can't be issued long in advance. Pay attention to weather clues around you that may warn of imminent danger.
  - Dark, often greenish sky. Sometimes one or more of the clouds turns greenish (a phenomenon caused by hail) indicating a tornado may develop.
  - Wall cloud, an isolated lowering of the base of a thunderstorm. The wall cloud is particularly suspect if it is rotating.
  - Large hail. Tornadoes are spawned from powerful thunderstorms and the most powerful thunderstorms produce large hail. Tornadoes

frequently emerge from near the hail-producing portion of the storm.

- Cloud of debris. An approaching cloud of debris can mark the location of a tornado even if a funnel is not visible.
- Funnel cloud. A visible rotating extension of the cloud base is a sign that a tornado may develop.
- Roaring noise. The high winds of a tornado can cause a roar that is often compared with the sound of a freight train.
- Tornadoes may occur near the trailing edge of a thunderstorm and be quite visible. It is not uncommon to see clear, sunlit skies behind a tornado. They may also be embedded in rain and not visible at all.

- If you live in a single-family home in a tornado-prone area, find out how to reinforce an interior room on the lowest level of your home (such as the basement, storm cellar, bathroom or closet) to use as a shelter. Plans for reinforcing an interior room to provide better tornado protection in your home are available from your local emergency management office or from FEMA's website at www.fema.gov.

What to Do During a Tornado WATCH

- Listen to a NOAA Weather Radio or local radio or television stations for updated information. Tornadoes can change direction, intensity, and speed very quickly.
- Be alert to changing weather conditions. Tornadoes accompany severe thunderstorms, and weather conditions can change rapidly. Large hail, blowing debris, or the sound of an approaching tornado may alert you. Many people say approaching tornadoes sound like a freight train.

What to Do During a Tornado WARNING

- Listen to a battery-powered NOAA Weather Radio, regular radio, or television for updated information. If the electricity should go out, you will still be able to receive emergency information.
- If you are inside, go to your safe place to protect yourself from glass and other flying objects. Tornadoes can change direction, intensity, and speed very quickly. The tornado may be approaching your area.
- Get under a piece of sturdy furniture, such as a workbench or heavy table, and hold on to it. Sturdy furniture will help protect you from falling debris. If tornado wind enters the room and the object moves, holding on with one hand will help you move with it, keeping you protected.

- Use your other arm and hand to protect your head and neck from falling or flying objects. Your head and neck are more easily injured than other parts of your body. Protect them as much as you can.
- Stay away from windows. Opening windows allows damaging winds to enter the structure. Leave the windows alone; instead, immediately go to a safe place. It is a myth that tornadoes cause houses to explode due to changes in air pressure. Flying debris can shatter glass. Violent winds and debris slamming into buildings cause most structural damage.
- If you're outside in a car or in a mobile home, go immediately to the basement of a nearby sturdy building. Sturdy buildings are the safest place to be. Tornado winds can blow large objects, including cars and mobile homes, hundreds of feet away. Tornadoes can change direction quickly and can lift up a car or truck and toss it through the air; never try to out-drive a tornado. Mobile homes are particularly vulnerable. A mobile home can overturn very easily even if precautions have been taken to tie down the unit.
- If there is no building nearby, lie flat in a low spot. Use your arms and hands to protect your head. Tornadoes cause a lot of debris to be blown at very high speeds, and you can be hurt by this debris if it hits you. Dangerous flying debris can be blown under highway overpasses and bridges, or weaker overpasses and bridges could be destroyed. You will be safer lying flat in a low-lying area where wind and debris will blow above you. Tornadoes come from severe thunderstorms, which can produce a lot of rain. If you see quickly rising water or flood water coming towards you, move to another spot.
- Avoid places with wide-span roofs, such as auditoriums, cafeterias, large hallways, or shopping malls. Wide-span roofs are frequently damaged or destroyed in tornado winds, providing less protection and more risk of injury, than roofs over smaller rooms.

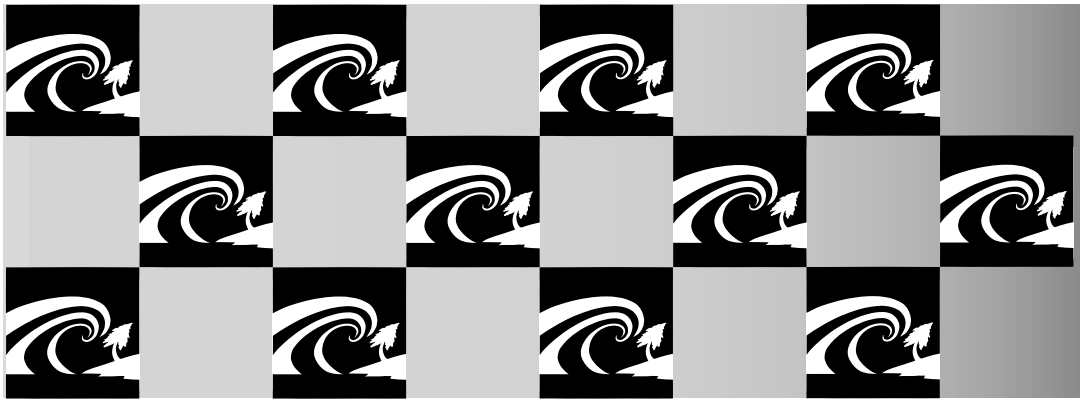
What to Do After a Tornado

- Continue listening to local radio or television stations or a NOAA Weather Radio for updated information and instructions. Access may be limited to some parts of the community, or roads may be blocked.
- Help a neighbor who may require special assistance — infants, elderly people and people with disabilities. Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance in emergency situations.
- Help injured or trapped persons. Give first aid where appropriate.

Do not move seriously injured persons unless they are in immediate danger of further injury. Call for help.

- Watch out for fallen power lines or broken gas lines and report them to the utility company immediately. Reporting potential hazards will get the utilities turned off as quickly as possible, preventing further hazard and injury.
- Avoid disaster areas. Your presence might hamper rescue and other emergency operations, and put you at further risk from the residual effects of tornadoes.
- Stay out of damaged buildings. Tornadoes can cause great damage, creating further hazards. If you are away from home, return only when authorities say it is safe.
- When entering damaged buildings, use extreme caution. Moving through debris presents further hazards. Carefully watch every step you take.
  - Wear sturdy shoes. The most common injury following a disaster is cut feet.
  - Use battery-powered lanterns or flashlights when examining buildings. Battery-powered lighting is the safest and easiest, preventing fire hazard for the user, occupants, and building.
  - Examine walls, floors, doors, staircases, and windows to make sure that the building is not in danger of collapsing.
  - Look for fire hazards. There may be broken or leaking gas lines, or damage to electrical systems. Clean up spilled medicines, bleaches, gasoline, or other flammable liquids immediately. Fire is the most frequent hazard following other disasters.
  - Check for gas leaks. If you smell gas or hear a blowing or hissing noise, open a window and quickly leave the building. Turn off the gas using the outside main valve if you can, and call the gas company from a neighbor's home. If you turn off the gas for any reason, it must be turned back on by a professional.
  - Look for electrical system damage. If you see sparks or broken or frayed wires, or if you smell burning insulation, turn off the electricity at the main fuse box or circuit breaker. If you have to step in water to get to the fuse box or circuit breaker, call an electrician first for advice. Electrical equipment should be checked and dried before being returned to service.
  - Watch for loose plaster, drywall, and ceilings that could fall.
  - Take pictures of the damage, both of the building and its contents, for insurance claims.

- Use the telephone only for emergency calls. Telephone lines are frequently overwhelmed in disaster situations. They need to be clear for emergency calls to get through.



Tsunami

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/ CSREES, and USGS

Why talk about tsunamis?

Twenty-four tsunamis have caused damage in the United States and its territories during the last 204 years. Just since 1946, six tsunamis have killed more than 350 people and caused a half billion dollars of property damage in Hawaii, Alaska, and the West Coast. As a tsunami nears the coastline, it may rise to several feet or, in rare cases, tens of feet, and can cause great loss of life and property damage when it comes ashore. Tsunamis can travel upstream in coastal estuaries and rivers, with damaging waves extending farther inland than the immediate coast. A tsunami can occur during any season of the year and at any time, day or night.

What are tsunamis, and what causes them?

Tsunamis are ocean waves produced by earthquakes or underwater landslides. The word is Japanese and means "harbor wave," because of the devastating effects these waves have had on low-lying Japanese coastal communities. Tsunamis are often incorrectly referred to as tidal waves, but a tsunami is actually a series of waves that can travel at speeds averaging 450 (and up to 600) miles per hour in the open ocean. In the open ocean, tsunamis would not be felt by ships because the wavelength would be hundreds of miles long, with an amplitude of only a few feet. This would also make them unnoticeable from the air. As the waves approach the coast, their speed decreases and their amplitude increases. Unusual wave heights have been known to be over 100 feet high. However, waves that are 10 to 20 feet high can be very destructive and cause many deaths or injuries.

Since 1946, six tsunamis have killed more than 350 people and damaged a half billion dollars of property in Hawaii, Alaska, and the West Coast.

Tsunamis are most often generated by earthquake-induced movement of the ocean floor. Landslides, volcanic eruptions, and even meteorites can also generate a tsunami. If a major earthquake is felt, a tsunami could

reach the beach in a few minutes, even before a warning is issued. Areas at greatest risk are less than 25 feet above sea level and within one mile of the shoreline. Most deaths caused by a tsunami are because of drowning. Associated risks include flooding, contamination of drinking water, fires from ruptured tanks or gas lines, and the loss of vital community infrastructure (police, fire, and medical facilities).

From an initial tsunami generating source area, waves travel outward in all directions much like the ripples caused by throwing a rock into a pond. As these waves approach coastal areas, the time between successive wave crests varies from 5 to 90 minutes. The first wave is usually not the largest in the series of waves, nor is it the most significant. Furthermore, one coastal community may experience no damaging waves while another, not that far away, may experience destructive deadly waves. Depending on a number of factors, some low-lying areas could experience severe inland inundation of water and debris of more than 1,000 feet.

Learn whether tsunamis have occurred in your area by contacting your local emergency management office, National Weather Service office, or American Red Cross chapter. If you are in a tsunami risk area, learn how to protect yourself, your family, and your property.

Awareness Information

The West Coast/Alaska Tsunami Warning Center (WC/ATWC) is responsible for tsunami warnings for California, Oregon, Washington, British Columbia, and Alaska.

The Pacific Tsunami Warning Center (PTWC) is responsible for providing warnings to international authorities, Hawaii, and U. S. territories within the Pacific basin. The two Tsunami Warning Centers coordinate the information being disseminated.

All tsunamis are potentially dangerous, even though they may not damage every coastline they strike. Damaging tsunamis are very rare. Our coastlines are vulnerable, but tsunamis are infrequent. Understand the hazard and learn how to protect yourself, but don't let the threat of tsunamis ruin your enjoyment of the beach.

The WC/ATWC and PTWC may issue the following bulletins:

- WARNING: A tsunami was or may have been generated, which could cause damage; therefore, people in the warned area are strongly advised to evacuate.
- WATCH: A tsunami was or may have been generated, but is at least two hours travel time to the area in watch status. Local officials should prepare for possible evacuation if their area is upgraded to a warning.
- ADVISORY: An earthquake has occurred in the Pacific basin, which might generate a tsunami. WC/ATWC and PTWC will issue hourly bulletins advising of the situation.

- INFORMATION: A message with information about an earthquake that is not expected to generate a tsunami. Usually only one bulletin is issued.

Be familiar with the tsunami warning signs. A strong earthquake lasting 20 seconds or more near the coast may generate a tsunami. A noticeable rapid rise or fall in coastal waters is also a sign that a tsunami is approaching.

Tsunamis most frequently come onshore as a rapidly rising turbulent surge of water choked with debris. They are not V-shaped or rolling waves, and are not "surfable."

Tsunamis may be locally generated or from a distant source. In 1992, the Cape Mendocino, California, earthquake produced a tsunami that reached Eureka in about 20 minutes, and Crescent City in 50 minutes. Although this tsunami had a wave height of about one foot and was not destructive, it illustrates how quickly a wave can arrive at nearby coastal communities and how long the danger can last.

In 1957, a distant-source tsunami generated by an earthquake in the Aleutian Islands in Alaska struck Hawaii, 2,100 miles away. Hawaii experienced $5 million in damages from that tsunami.

Plan for a Tsunami

Develop a Family Disaster Plan. Please see the "Family Disaster Plan" section for general family planning information. Tsunami-specific planning should include the following:

- Learn about tsunami risk in your community. Contact your local emergency management office or American Red Cross chapter. Find out if your home, school, workplace or other frequently visited locations are in tsunami hazard areas. Know the height of your street above sea level and the distance of your street from the coast or other high-risk waters. Evacuation orders may be based on these numbers.
- If you are visiting an area at risk from tsunamis, check with the hotel, motel, or campground operators for tsunami evacuation information and how you would be warned. It is important to know designated escape routes before a warning is issued.

If you are at risk from tsunamis, do the following:

- Plan an evacuation route from your home, school, workplace, or any other place you'll be where tsunamis present a risk. If possible, pick an area 100 feet above sea level or go up to two miles inland, away from the coastline. If you can't get this high or far, go as high as you can. Every foot inland or upwards may make a difference. You should be able to reach your safe location on foot within 15 minutes. After a disaster, roads may become impassable or blocked. Be prepared

to evacuate by foot if necessary. Footpaths normally lead uphill and inland, while many roads parallel coastlines. Follow posted tsunami evacuation routes; these will lead to safety. Local emergency management officials can help advise you as to the best route to safety and likely shelter locations.

- Practice your evacuation route. Familiarity may save your life. Be able to follow your escape route at night and during inclement weather. Practicing your plan makes the appropriate response more of a reaction, requiring less thinking during an actual emergency situation.
- Use a NOAA Weather Radio with a tone-alert feature to keep you informed of local watches and warnings. The tone alert feature will warn you of potential danger even if you are not currently listening to local radio or television stations.
- Talk to your insurance agent. Homeowners' policies do not cover flooding from a tsunami. Ask about the National Flood Insurance Program.
- Discuss tsunami with your family. Everyone should know what to do in case all family members are not together. Discussing tsunamis ahead of time will help reduce fear and anxiety, and let everyone know how to respond. Review flood safety and preparedness measures with your family.

Assemble a Disaster Supplies Kit

Please see the section "Disaster Supplies Kit" for general supplies kit information. Tsunami–specific supplies should include the following:

- Disaster Supplies Kit basics.
- Evacuation Supplies Kit in an easy-to-carry container (backpack) near your door.

How to Protect Your Property

- Avoid building or living in buildings within several hundred feet of the coastline. These areas are more likely to experience damage from tsunamis, strong winds, or coastal storms.
- Make a list of items to bring inside in the event of a tsunami. A list will help you remember anything that can be swept away by tsunami waters.
- Elevate coastal homes. Most tsunami waves are less than 10 feet. Elevating your house will help reduce damage to your property from most tsunamis.
- Follow flood preparedness precautions. Tsunamis are large amounts of water that crash onto the coastline, creating floods.
- Have an engineer check your home and advise about ways to make it more resistant to tsunami water. There may be ways to divert waves away from your property. Improperly built walls could

make your situation worse. Consult with a professional for advice.

Media and Community Education Ideas

- If your community is at risk, build and publicize locations of tsunami evacuation routes. Post signs directing people to higher ground away from the coast.
- Review land use in tsunami hazard areas so no critical facilities, such as hospitals and police stations; or high occupancy buildings, such as auditoriums or schools; or petroleum-storage tank farms are located where there is a tsunami hazard. Tsunami damage can be minimized through land use planning, preparation, and evacuation.
- Publish a special section in your local newspaper with emergency information on tsunamis. Localize the information by printing the phone numbers of local emergency services offices, the American Red Cross chapter, and hospitals.
- Periodically inform your community of local public warning systems.
- Work with local emergency services and American Red Cross officials to prepare special reports for people with mobility impairments on what to do if an evacuation is ordered, and develop plans to assist them with evacuation if necessary.
- Interview local officials and insurance companies about the proper types of insurance to cover a flood-related loss. Include information on the economic effects of disaster.

What to Do if You Feel a *Strong* Coastal Earthquake

If you feel an earthquake that lasts 20 seconds or longer when you are on the coast:

- Drop, cover, and hold on. You should first protect yourself from the earthquake.
- When the shaking stops, gather your family members and evacuate quickly. Leave everything else behind. A tsunami may be coming within minutes. Move quickly to higher ground away from the coast.
- Be careful to avoid downed power lines and stay away from buildings and bridges from which heavy objects might fall during an aftershock.

What to Do When a Tsunami WATCH Is Issued

- Listen to a NOAA Weather Radio, Coast Guard emergency frequency station, or other reliable source for updated emergency information. As the energy of a tsunami is transferred through open water, it is not detectable. Seismic action may be the only advance

warning before the tsunami approaches the coastline.

- Check your Disaster Supplies Kit. Some supplies may need to be replaced or restocked.
- Locate family members and review evacuation plans. Make sure everyone knows there is a potential threat and the best way to safer ground.
- If you have special evacuation needs (small children, elderly people, or persons with disabilities) consider early evacuation. Evacuation may take longer, allow extra time.
- If time permits, secure unanchored objects around your home or business. Tsunami waves can sweep away loose objects. Securing these items or moving them inside will reduce potential loss or damage.
- Be ready to evacuate. Being prepared will help you to move more quickly if a tsunami warning is issued.

What to Do When a Tsunami WARNING Is Issued

- Listen to a NOAA Weather Radio, Coast Guard emergency frequency station, or other reliable source for updated emergency information. Authorities will issue a warning only if they believe there is a real threat from tsunami.
- Follow instructions issued by local authorities. Recommended evacuation routes may be different from the one you use, or you may be advised to climb higher.
- If you are in a tsunami risk area, do the following:
  - If you hear an official tsunami warning or detect signs of a tsunami, evacuate at once. A tsunami warning is issued when authorities are certain that a tsunami threat exists, and there may be little time to get out.
  - Take your Disaster Supplies Kit. Having supplies will make you more comfortable during the evacuation.
  - Get to higher ground as far inland as possible. Officials cannot reliably predict either the height or local effects of tsunamis. Watching a tsunami from the beach or cliffs could put you in grave danger. If you can see the wave, you are too close to escape it.

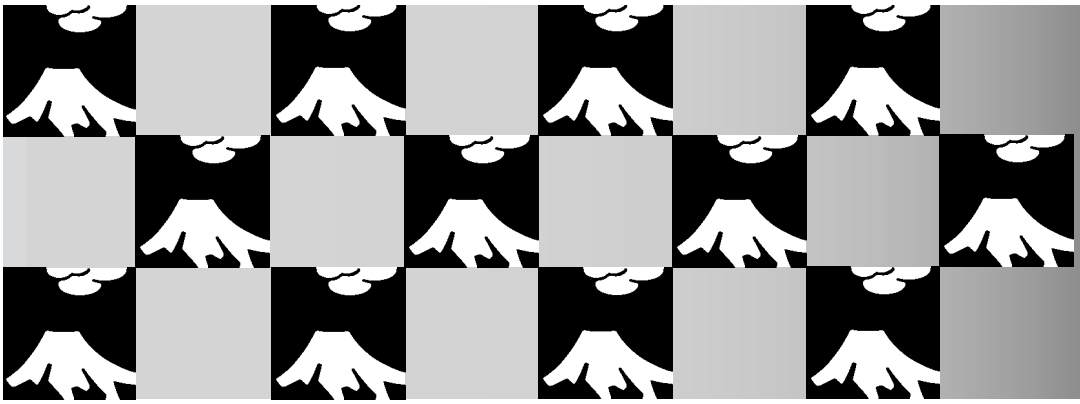
Return home only after local officials tell you it is safe. A tsunami is a series of waves that may continue for hours. Do not assume that after one wave the danger is over. The next wave may be larger than the first one.

What to Do After a Tsunami

- Continue listening to a NOAA Weather Radio, Coast Guard emergency frequency station, or other reliable source for emergency information. The tsunami may have damaged roads, bridges, or other places that may be unsafe.
- Help injured or trapped persons. Give first aid where appropriate. Call for help. Do not move seriously injured persons unless they are in immediate danger of further injury.
- Help a neighbor who may require special assistance — infants, elderly people, and people with disabilities. Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance in emergency situations.
- Use the telephone only for emergency calls. Telephone lines are frequently overwhelmed in disaster situations. They need to be clear for emergency calls to get through.
- Stay out of the building if waters remain around it. Tsunami waters, like flood waters, can undermine foundations, causing buildings to sink, floors to crack, or walls to collapse.
- When re-entering buildings or homes, use extreme caution. Tsunami-driven flood waters may have damaged buildings where you least expect it. Carefully watch every step you take.
    - Wear sturdy shoes. The most common injury following a disaster is cut feet.
    - Use battery-powered lanterns or flashlights when examining buildings. Battery-powered lighting is the safest and easiest, preventing fire hazard for the user, occupants, and building.
    - Examine walls, floors, doors, staircases, and windows to make sure that the building is not in danger of collapsing.
    - Inspect foundations for cracks or other damage. Cracks and damage to a foundation can render a building uninhabitable.
    - Look for fire hazards. There may be broken or leaking gas lines, flooded electrical circuits, or submerged furnaces or electrical appliances. Flammable or explosive materials may come from upstream. Fire is the most frequent hazard following floods.
    - Check for gas leaks. If you smell gas or hear a blowing or hissing noise, open a window and quickly leave the building. Turn off the gas using the outside main valve if you can, and call the gas company from a neighbor's home. If you turn off the gas for any reason, it must be turned back on by a professional.

- Look for electrical system damage. If you see sparks or broken or frayed wires, or if you smell burning insulation, turn off the electricity at the main fuse box or circuit breaker. If you have to step in water to get to the fuse box or circuit breaker, call an electrician first for advice. Electrical equipment should be checked and dried before being returned to service.
- Check for sewage and water line damage. If you suspect sewage lines are damaged, avoid using the toilets and call a plumber. If water pipes are damaged, contact the water company and avoid using water from the tap. You can obtain safe water from undamaged water heaters or by melting ice cubes.
- Use tap water if local health officials advise it is safe.
- Watch out for animals, especially poisonous snakes, that may have come into buildings with the water. Use a stick to poke through debris. Tsunami flood waters flush snakes and animals out of their homes.
- Watch for loose plaster, drywall, and ceilings that could fall.
- Take pictures of the damage, both of the building and its contents, for insurance claims.

- Open the windows and doors to help dry the building.
- Shovel mud while it is still moist to give walls and floors an opportunity to dry.
- Check food supplies. Any food that has come in contact with flood waters may be contaminated and should be thrown out.



Volcano

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/ CSREES, and USGS

Why talk about volcanoes?

The United States is third in the world, after Japan and Indonesia, for the number of active volcanoes. Since 1980, as many as five volcanoes have erupted each year in the United States. Eruptions are most likely to occur in Hawaii and Alaska. For the Cascade Range in Washington, Oregon, and California, volcanoes erupt on the average of one to two each century. Volcanoes produce a wide variety of hazards that can kill people and destroy property. Large explosive eruptions can endanger people and property hundreds of miles away and even affect global climate.

What are volcanoes, and what causes them to erupt?

A volcano is a vent through which molten rock escapes to the earth's surface. Unlike other mountains, which are pushed up from below, volcanoes are built by surface accumulation of their eruptive products — layers of lava, ashflows, and ash. When pressure from gases within the molten rock becomes too great, an eruption occurs. Volcanic hazards include gases, lava and pyroclastic flows, landslides, earthquakes, and explosive eruptions.

The United States is third in the world, after Japan and Indonesia, for the number of active volcanoes. Since 1980, as many as five volcanoes have erupted each year in the United States.

Eruptions can be relatively quiet, producing lava flows that creep across the land at 2 to 10 miles per hour. Explosive eruptions can shoot columns of gases and rock fragments tens of miles into the atmosphere, spreading ash hundreds of miles downwind.

Lava flows are streams of molten rock that either pour from a vent quietly or explosively by lava fountains. Because of their intense heat, lava flows are also great fire hazards. Lava flows destroy everything in their path, but most move slowly enough that people can move out of the way. The speed at which lava moves across the ground depends on several

factors, including the type of lava erupted, the steepness of the ground, and the rate of lava production at the vent.

Volcanic eruptions can be accompanied by other natural hazards: earthquakes, mudflows and flash floods, rockfalls and landslides, wildland fires, and (under special conditions) tsunamis.

Historically, lahars have been one of the deadliest volcano hazards. Lahars are mudflows or debris flows composed mostly of volcanic materials on the flanks of a volcano. These flows of mud, rock, and water can rush down valley and stream channels at speeds of 20 to 40 miles per hour and can travel more than 50 miles. Some lahars contain so much rock debris that they look like fast-moving rivers of wet concrete. They can occur both during an eruption and when a volcano is quiet. The water that creates lahars can come from melting snow and ice, intense rainfall, or the breakout of a summit crater lake. Large lahars are a potential hazard to many communities downstream from glacier-clad volcanoes, such as Mount Rainier in Washington.

Volcanic ash is actually fine, glassy rock fragments and can affect people and equipment hundreds of miles away from the cone of the volcano. Volcanic ash can contaminate water supplies, cause electrical storms, disrupt the operation of all machinery, and collapse roofs. Volcanic ash poses an ever-increasing threat to aviation safety as transportation expands throughout the Pacific rim. Airborne ash can diminish visibility, damage flight control systems, and cause jet engines to fail. Many federal agencies, including the U.S. Geological Survey (USGS), the Federal Aviation Administration, and the NOAA/National Weather Service, are working together to issue timely warnings to airports and airline pilots.

Volcanoes usually give warning that they will erupt. USGS scientists have developed a forecasting system to alert public officials and the general public to the fact that a volcano may erupt.

Learn about volcano risk in your community. Contact your local emergency management office, American Red Cross chapter, or state geological surveys or departments of natural resources. Ask about the type of volcano hazards that could affect your area.

Awareness Information

Most eruptions at Hawaiian volcanoes are not explosive and are characterized by the relatively quiet outflow of very fluid lava. These eruptions can still be deadly, because the lava may be erupted in huge volumes, and on steeper slopes, fluid lava can rapidly travel many miles from its source. The island of Hawaii (the largest of the Hawaiian islands) experiences thousands of earthquakes associated with active volcanoes each year. Most of these are too small to feel, but about once a decade, a large quake shakes the entire island and causes widespread damage. Before and during an eruption, many small earthquakes occur as molten rock forces its way through the upper parts of a volcano's interior. Such quakes often provide

early warnings of changes in eruptive activity.

In the past few thousand years, the volcanoes of the Cascade Range, which stretches from northern California into British Columbia, have produced more than 100 eruptions, most of them explosive. However, individual Cascades volcanoes can lie dormant for many centuries between eruptions, and the great risk posed by volcanic activity in the region is therefore not always apparent. When Cascades volcanoes do erupt, high-speed avalanches of hot ash and rock (pyroclastic flows), lava flows, and landslides can devastate areas 10 or more miles away, and huge mudflows of volcanic ash and debris (lahars) can inundate valleys more than 50 miles downstream.

Plan for a Volcanic Eruption

Develop a Family Disaster Plan. Please see the "Family Disaster Plan" section for general family planning information. Develop a volcano-specific plan. Learn about volcanic activity in your community. While volcanoes are located in specific areas, ash may be carried some distance away during an explosive eruption. Contact your local emergency management agency, American Red Cross chapter, or state geological survey or department of natural resources.

If you are at risk from volcanic activity:

- Learn about your community warning systems and emergency plans. Different communities have different ways of providing warnings and different responses. Discuss volcanic activity. Many communities have sirens intended for outdoor warning purposes. Use a NOAA Weather Radio with a tone-alert feature to keep you aware of watches and warnings while you are indoors.
- Talk to your insurance agent. Find out what your homeowner's policy will or won't cover in the event of a volcanic eruption.
- Develop an evacuation plan. (See "Evacuation" in the "Family Disaster Plan" section.) Everyone in your family should know where to go if they have to leave. Trying to make plans at the last minute can be upsetting and create confusion.
- Discuss volcanoes with your family. Everyone should know what to do in case all family members are not together. Discussing volcanic eruptions ahead of time will help reduce fear and anxiety, and lets everyone know how to respond. Review landslide and mudflow safety and preparedness measures with your family.

Assemble a Disaster Supplies Kit

Please see the "Disaster Supplies Kit" section for general supplies kit information. Volcanic eruption–specific supplies should include the following:

- A pair of goggles and a throw-away breathing mask for each member of the household in case of ashfall.
- Disaster Supply Kit basics.
- Evacuation Supply Kit.

Media and Community Education Ideas

- If you live in a volcano risk area, publish a special section in your local newspaper with emergency information on volcanoes. Localize the information by including the phone numbers of local emergency services offices, the American Red Cross chapter, and local hospitals.
- Feature an interview with a representative of the U.S. Geological Survey, talking about how this group determines the likelihood of a volcanic eruption.
- Run a series on local volcanic hazards and how to recognize the warning signals of a possible volcanic eruption.
- Work with local emergency services and American Red Cross officials to prepare special reports for people who are disabled on what to do if an evacuation is ordered.
- Publish emergency evacuation routes.

What to Do During a Volcanic Eruption

- Be prepared for the hazards that can accompany volcanic eruptions, and know how to respond to reduce risk. Hazards include the following:
  - Mudflows and flash floods. Mudflows are powerful "rivers" of mud that can move 20 to 40 miles per hour. Hot ash or lava from a volcanic eruption can rapidly melt snow and ice at the summit of a volcano. The melted water quickly mixes with falling ash, with soil cover on lower slopes, and with debris in its path. This turbulent mixture is dangerous in stream channels and can travel more than 50 miles away from a volcano. Intense rainfall can erode fresh volcanic deposits to form large mudflows. If you see the water level of a stream begin to rise, quickly move to high ground. If a mudflow is approaching or passes a bridge, stay away from the bridge.
  - Landslides and rockfalls.
  - Earthquakes.
  - Ashfall and acid rain.
- Follow the evacuation order issued by authorities and put your disaster plan into action. Although it may seem safe to stay at home and wait out an eruption, if you are in a hazardous zone, doing so could be very dangerous. The advice of local authorities is your best advice for staying safe.
- Avoid areas downwind and river valleys downstream of the volcano. Debris and ash will be carried by wind and gravity. Stay in areas where you will not be further exposed to volcanic eruption hazards.

- If caught indoors:
  - Close all windows, doors, and dampers to keep volcanic ash from entering.
  - Put all machinery inside a garage or barn to protect it from volcanic ash. If buildings are not available, cover machinery with large tarps.
  - Bring animals and livestock into closed shelters to protect them from breathing volcanic ash.
- If trapped outdoors:
  - Seek shelter indoors. Your safest place is indoors, away from various hazards.
  - If caught in a rockfall, roll into a ball to protect your head and neck. A tight ball will provide the best protection for your body. Your head and neck are more easily injured than other parts of your body.
  - If caught near a stream, be aware of mudflows, especially if you hear the roar of an approaching mudflow. Mudflows often accompany volcanic eruptions. Move quickly out of the path.
- Stay out of the area defined as a restricted zone by government officials. Effects of a volcanic eruption can be experienced many miles from a volcano. Mudflows and flash flooding, wildland fires, and even deadly hot ashflow can reach you even if you cannot see the volcano during an eruption.
- Avoid river valleys and low-lying areas. Trying to watch an erupting volcano up close is a deadly idea.
- Listen to a portable, battery-operated radio or television for updated emergency information and instructions. If the electricity is out, this may be your main source of information. Local radio and local officials provide the most appropriate advice for your particular situation.

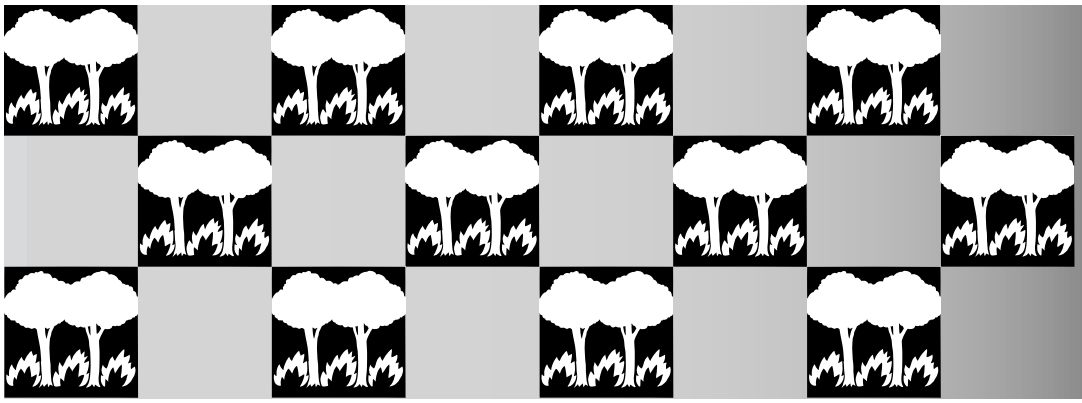
How to Protect Yourself During Ashfall

Volcanic ash is actually fine, glassy fragments and particles that can cause severe injury to breathing passages, eyes, and open wounds, and irritation to skin.

- Wear long-sleeved shirts and long pants.
- Use goggles to protect your eyes.
- Wear eyeglasses instead of contact lenses.
- Use a dust mask or hold a damp cloth over your face to help breathing.
- Keep car or truck engines off.

What to Do After a Volcanic Eruption

- Help a neighbor who may require special assistance — infants, elderly people, and people with disabilities. Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance in emergency situations.
- If possible, stay away from volcanic ashfall areas. The fine, glassy particles of volcanic ash can increase the health risk to children and people with existing respiratory conditions such as asthma, chronic bronchitis, or emphysema. Stay indoors, wear face masks designed to protect against lung damage from small particles, use eyeglasses instead of contacts, and protective goggles to protect eyes.
- When outside, protect yourself from the fine, glassy particles of volcanic ash.
  - Cover your mouth and nose.
  - Wear goggles to protect your eyes.
  - Wear eyeglasses instead of contact lenses.
  - Keep skin covered to avoid irritation from contact with ash.
- Clear roofs of ashfall. Ashfall is very heavy and can cause buildings to collapse, especially if made wet by rainfall. Exercise great caution when working on a roof.
- Avoid driving in heavy ashfall. Driving will stir up volcanic ash that can clog engines and stall vehicles. Moving parts can be damaged from abrasion, including bearings, brakes, and transmissions.
- If you have a respiratory ailment, avoid contact with any amount of ash. Stay indoors until local health officials advise it is safe to go outside. Volcanic ash can cause great damage to breathing passages and the respiratory system.



Wildfire

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/ CSREES, and USGS

Why talk about wildfire?

More and more people are making their homes in woodland settings in or near forests, rural areas, or remote mountain sites. There, homeowners enjoy the beauty of the environment but face the very real danger of wildfire. Wildfires often begin unnoticed. They spread quickly, igniting brush, trees, and homes.

What are wildfires, and what causes them?

There are three different classes of wildfires. A "surface fire" is the most common type and burns along the floor of a forest, moving slowly and killing or damaging trees. A "ground fire" is usually started by lightning and burns on or below the forest floor in the human layer down to the mineral soil. "Crown fires" spread rapidly by wind and move quickly by jumping along the tops of trees.

Wildfires often begin unnoticed. They spread quickly, igniting brush, trees, and homes.

Learn if you are at risk from wildfire by contacting your local fire department, forestry service, or other emergency response agencies.

Awareness Information

More than four out of every five forest fires are started by people. Negligent human behavior, such as smoking in forested areas or improperly extinguishing campfires, is the cause of many forest fires. Another cause of forest fires is lightning.

Plan for Wildfire

Develop a Family Disaster Plan. Please see the "Family Disaster Plan" section for general family planning information. Develop a wildfire-specific plan. Learn about your area's wildfire risk. Contact your local fire department, forestry service or other emergency response agencies for

information on fire laws and wildfire risk.

If you are at risk from wildfire:

- When building or planting, consult with your local planning and zoning department, fire department, or local building officials. There may be restrictions on the types of materials or plants used in residential areas. Following local codes or recommendations will help reduce injury and damage to you and your property.
- Make sure that fire vehicles can get to your home. If wildfires threaten, firefighters will try to reduce damage around your home.
- Clearly mark all driveway entrances and display your name and address.
- Post fire emergency telephone numbers. If wildfires threaten, contacting emergency officials as quickly as possible may reduce further damage. Having critical phone numbers posted will avoid wasted time looking them up.
- Plan two ways out of your neighborhood. Your primary route may be blocked; know another way out just in case.
- Plan your water needs. Sometimes you may be able to fight small fires, preventing them from becoming larger or delaying their effects until emergency responders with appropriate materials arrive on the scene.
- Identify and maintain an adequate outside water source such as a small pond, cistern, well, swimming pool, or hydrant.
- Keep a garden hose that is long enough to reach any area of the home and other structures on the property.
- Install freeze-proof exterior water outlets on at least two sides of the home and near other structures on the property. Install additional outlets at least 50 feet from the home.
- Consider obtaining a portable gasoline-powered water pump in case electrical power is cut off.
- Develop an evacuation plan. (See "Evacuation" in the "Family Disaster Plan" section.) Everyone in your family should know where to go if they have to leave. Trying to make plans at the last minute can be upsetting and create confusion.
- Discuss wildfire with your family. Everyone should know what to do in case all family members are not together. Discussing wildfire ahead of time will help reduce fear and anxiety, and lets everyone know how to respond.

What to Tell Children

- Practice stop, drop, and roll. Know how to stop, drop, and roll in case your clothes catch on fire. Stop what you are doing, drop to the ground, cover your face, and roll back and forth until the flames go out. Running will only make the fire burn faster. Practicing makes the appropriate response more of an automatic reaction, requiring less thinking time during an actual emergency situation.
- Matches and lighters are tools for "grown-ups". These tools help adults use fire properly. Instruct children to tell an adult right away if they see someone playing with fire, matches, or lighters. National Fire Protection Association research has shown that children associate tools with grown-ups, and "grown-up" is a term children use for someone in authority.
- Firefighters are our friends, and they will help in case of a fire. Visit a fire station to help ease children's fears. A fire suit and mask are often frightening and children may try to hide from a firefighter in full protective gear.

Assemble a Disaster Supplies Kit

Please see the "Disaster Supplies Kit" section for general supplies kit information. Wildfire–specific supplies should include the following:

- Sturdy work clothes, gloves, and boots.
- Disaster Supply Kit basics.
- Evacuation Supply Kit.

Please see the "Fire" section for more children's messages.

How to Protect Your Property

Houses and Buildings

- Design and landscape your home with wildfire safety in mind. Obtain local building codes and weed abatement ordinances for structures built near wooded areas. There may be restrictions on the types of materials or plants used in residential areas. Following local codes or recommendations will help reduce injury and damage to you and your property.
- Select materials and plants that can help resist fire rather than fuel it. Use fire resistant or noncombustible materials (tile, stucco, metal siding, brick, concrete block, or rock) on the roof and exterior structure of the dwelling. Treat wood or combustible materials used in roofs, siding, decking, or trim with fire-retardant chemicals that have been listed by the Underwriter's Laboratory (UL). Avoid using wooden shakes and shingles for a roof. Use only thick, tempered safety glass in large windows. Sliding glass doors are already required to be made of tempered safety glass.
- Install electrical lines underground, if possible. There is a greater chance of fire from overhead lines that fall or are damaged, such as in an earthquake or storm.

- Create a safety zone to separate your home from combustible plants and vegetation. (Consult your local fire department for recommendations about the safety zone for your property.) Maintain the greatest distance possible between your home and materials that may burn in wildfire. Within this area, you can take steps to reduce potential exposure to flames and radiant heat. Stone walls can act as heat shields and deflect flames. Swimming pools and patios can be a safety zone.
- If your home sits on a steep slope, standard protective measures may not suffice. Fire moves quickly up steep slopes. A larger safety zone may be necessary. Contact your local fire department or forestry office for additional information.
- Equip chimneys and stovepipes with a spark arrester that meets the requirements of National Fire Protection Association Code 211. (Contact your local fire department for exact specifications.) This will reduce the chance of burning cinders escaping through the chimney, starting outdoor fires.
- Have a fire extinguisher and get training from the fire department on how to use it. Different extinguishers operate in different ways. Unless you know how to use your extinguisher, you may not be able to use it effectively. There is no time to read directions during an emergency.
- Consider installing protective shutters or heavy fire-resistant drapes. The heat from a fire creates wind, which can blow hot cinders, sometimes large enough and with enough force to break windows. Reduce the potential for these cinders to cause your home to burn.
- Keep a ladder handy that will reach the roof. You may need to get on the roof to wet it down or remove flammable debris.
- Keep household items handy that can be used as fire tools: a rake, ax, hand-saw or chain-saw, bucket, and shovel. You may need to fight small fires before emergency responders arrive. Having this equipment will make your efforts more effective.

Plants and Vegetation

- Plant fire-resistant shrubs and trees in your safety zone and on the remainder of your property. Fire-resistant plants are less likely to catch and spread fire closer to your home. For example, hardwood trees are more fire-resistant than pine, evergreen, eucalyptus, or fir trees.
- Rake away leaves, dead limbs, and twigs. Remove leaves and rubbish from under structures and dispose of them properly. Clear all flammable vegetation. This will help reduce the fuel load.

- Have a professional tree service thin a 15-foot space between tree crowns, and remove limbs within 6 to 10 feet of the ground. This will help reduce the chance of fire spreading from tree to tree or from ground to tree.
- Remove dead branches from all trees. Dead branches are easily combustible.
- Keep all tree and shrub limbs trimmed so they don't come in contact with electrical wires. Electrical wires can be easily damaged or knocked loose by swaying branches.
- Keep trees adjacent to buildings free of dead or dying wood and moss. Taller plants are more likely to spread fire.
- Prune tree branches and shrubs within 15 feet of a stovepipe or chimney outlet.

Reducing Fire Hazards

- Ask the power company to clear branches from power lines. High-voltage power lines can be very dangerous. If a line should fall, it can cause injury or fire to others. Only authorized and trained professionals should work around them.
- Remove vines from the walls of the home. Even live vines can spread fire quickly.
- Mow and water grass regularly. This will help reduce the fire load.
- Place propane tanks at least 30 feet from the home or other structures. Propane tanks can explode under certain conditions. Make sure a pressure-relief valve is installed on the propane tank.
- Clear a 10-foot area around propane tanks and the barbecue. Place a metal screen over the grill — use nonflammable material with mesh no coarser than one-quarter inch. This will help reduce the chance and lessen the effects of fire.
- Regularly dispose of newspapers and rubbish at an approved site. Follow local burning regulations. Regular disposal of flammable items will reduce the fuel available for fire.
- Place stove, fireplace, and grill ashes in a metal bucket, soak in water for two days, then bury the cold ashes in mineral soil. Fires can start quickly from hidden cinders or burnt materials that are still hot. Once they are burned, chunks of flammable items can ignite at lower temperatures. Bury ashes to avoid potential fires.
- Stack firewood at least 30 feet away and uphill from your home. Clear combustible material within 20 feet of stack. Use only UL-listed wood burning devices. Fire tends to travel uphill, keeping

highly combustible firewood and other materials above your home will reduce the effects of fire on your home.

- Regularly clean roof and gutters. Remove all dead limbs, needles, and debris that spread fire.
- Place metal screens over openings to prevent collection of litter. Cover openings to floors, roof, and attic with screen. Use quarter-inch mesh screen beneath porches, decks, floor areas, and the home itself. (Eighth- or sixteenth-inch mesh screen is better.) Leaves, branches, twigs, and loose papers quickly increase the fuel available for a fire.
- Avoid open burning completely, especially during the fire season. Ash and cinders lighter than air float and may be blown into areas with heavy fuel load, starting wildfires.
- Report hazardous conditions that could cause a wildfire. Community responders may be able to eliminate or reduce conditions that could cause fire.

Media and Community Education Ideas

- Talk to your neighbors about wildfire safety. Plan how the neighborhood could work together before and after a wildfire. Make a list of your neighbors' skills, such as medical or technical. Consider how you could help neighbors who have special needs, such as elderly or disabled persons. Make plans to take care of children who may be on their own if parents can't get home.
- Publish a special section with emergency information about wildfires. Localize the information by printing the phone numbers of local emergency services offices, the American Red Cross chapter, and hospitals. Report the areas most at risk from wildfires and let people know of the advantages of creating a fire safety zone around structures and of using fire-resistant roofing materials when building or reroofing.
- Work with local emergency services and American Red Cross officials to prepare special reports for people with mobility problems on what to do if an evacuation is ordered.
- Print local building codes and weed abatement ordinances for structures built near wooded areas.
- Report on the advantages of regular chimney sweepings.
- Periodically inform your community of local public warning systems.

How to Prevent Wildfire

- Build fires away from nearby trees or bushes. Ash and cinders lighter than air float and may be blown into areas with heavy fuel load, starting wildfires.

- Always have a way to extinguish the fire quickly and completely. If the fire becomes threatening, you will need to extinguish it immediately.
- Never leave a fire — even a cigarette — burning unattended. Fire can quickly spread out of control.

What to Do When Wildfire Threatens

- Listen regularly to local radio or television stations for updated emergency information. Follow the instructions of local officials. Wildfire can change direction and speed suddenly. A minor threat can quickly escalate to a major threat. Local officials will be able to advise you of the safest escape route, which may be different than you expect.
- Back your car into the garage or park it in an open space facing the direction of escape. Shut doors and roll up windows. Leave the key in the ignition. Close garage windows and doors, but leave them unlocked. Disconnect automatic garage door openers because power may go out. These steps will make it easier to leave quickly should wildfire threaten.
- Confine pets to one room. Make plans to care for your pets in case you must evacuate. Pets may try to run if they feel threatened by fire. Keeping them inside and in one room will allow you to find them quickly if you need to leave.
- Arrange temporary housing at a friend or relative's home outside the threatened area. You will be more comfortable in someone's home than in a public shelter. Plus, many shelters do not allow pets.
- If you're sure you have time, take steps to reduce the chance of your home catching fire or lessen the amount of damage from a nearby fire.

Inside Your Home

- Shut off gas at the meter.
- Open fireplace damper. Close fireplace screens.
- Close windows, vents, doors, venetian blinds or noncombustible window coverings, and heavy drapes. Remove flammable drapes and curtains.
- Move flammable furniture into the center of the home away from windows and sliding-glass doors.
- Close all doors and windows inside your home to prevent draft.
- Place valuables that will not be damaged by water in a pool or pond.

Outside Your Home

- If hoses and adequate water are available, place sprinklers on roofs and on anything that might be damaged by fire.
- Seal attic and ground vents with precut plywood or commercial seals.
- Remove combustible items from around the house, lawn and poolside furniture, umbrellas, tarp coverings, and firewood.
- Connect the garden hose to outside taps.
- Set up the portable gasoline-powered pump.
- Place lawn sprinklers on the roof and near above-ground fuel tanks. Wet the roof.
- Wet shrubs within 15 feet of the home.
- Gather fire tools.
- Be ready to evacuate all family members and pets when the fire nears or when instructed to do so by local officials. You may need to leave quickly, without much warning. There may be only minutes before the fire is upon you.
- If you are trapped, crouch in a pond or river. You cannot outrun a fire. Cover your head and upper body with wet clothing. If water is not around, look for shelter in a cleared area or among a bed of rocks. Lie flat and cover your body with wet clothing or soil. Breathe the air close to the ground through a wet cloth to avoid scorching lungs or inhaling smoke. Wildfires move very fast and create their own wind, helping them to move even faster.

What to Do if Evacuation Is Necessary

- If advised to evacuate, *do so immediately.* You may have only minutes to act. Save yourself.
- Wear protective clothing — sturdy shoes, cotton or woolen clothing, long pants, a long-sleeved shirt, gloves, and a handkerchief to protect your face. Hot embers or cinders can burn your skin if you come into contact with them. Smoke can make it difficult to breathe, damaging breathing passages.
- Take your Disaster Supplies Kit. These items will make you more comfortable while you are away from home.
- Lock your home. There may be others who evacuate after you or return before you. Secure your house as you normally would.
- Tell someone outside of the wildfire area where you are going. Relatives and friends will be concerned about your safety. Letting some-

one know your travel plans will help relieve their fear and anxiety.

- Choose a route away from fire hazards. Watch for changes in the speed and direction of fire and smoke. Staying as far away as possible will provide you with the greatest safety.

What to Do After a Wildfire

- Use caution and exercise good judgment when re-entering a burned wildland area. Hazards may still exist, including hot spots, which can flare up without warning.
- Avoid damaged or fallen power poles or lines, and downed wires. Immediately report electrical damage to authorities. Electric wires may shock people or cause further fires. If possible, remain on the scene to warn others of the hazard until repair crews arrive.
- Be careful around burned trees and power poles. They may have lost stability due to fire damage.
- Watch for ash pits and mark them for safety. Ash pits are holes full of hot ashes, created by burned trees and stumps. You can be seriously burned by falling into ash pits or landing in them with your hands or feet. Warn your family and neighbors to keep clear of the pits.
- If a power line or pole should fall next to you, hop out of the area. You are less likely to be shocked if you are hopping.

Returning to Your Home

- If there is no power, check to make sure the main breaker is on. Fires may cause breakers to trip. If the breakers are on and power is still not present, contact the utility company.
- Inspect the roof immediately and extinguish any sparks or embers. Wildfires may have left burning embers that could reignite.
- For several hours afterward, recheck for smoke and sparks throughout the home, including the attic. The winds of wildfires can blow burning embers anywhere. Keep checking your home for embers that could cause fires.
- Take precautions while cleaning your property. You may be exposed to potential health risks from hazardous materials.
  - Debris should be wetted down to minimize health impacts from breathing dust particles.
  - Use a two-strap dust particulate mask with nose clip and coveralls for the best minimal protection.
  - Wear leather gloves to protect hands from sharp objects

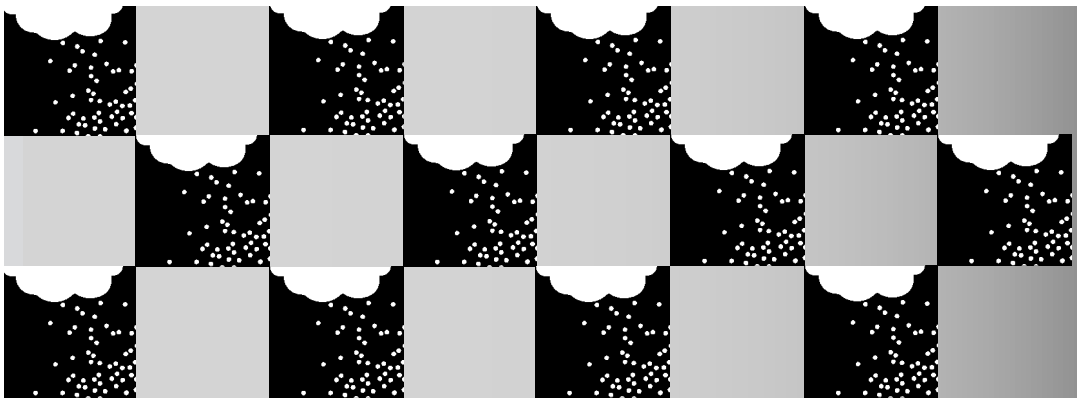
while removing debris.

- Wear rubber gloves when working with outhouse remnants, plumbing fixtures, and sewer piping. They can contain high levels of bacteria.
- Hazardous materials such as kitchen and bathroom cleaning products, paint, batteries, contaminated fuel and damaged fuel containers need to be properly handled to avoid risk. Check with local authorities for hazardous disposal assistance.

- If you have a propane tank system, contact a propane supplier, turn off valves on the system, and leave valves closed until the supplier inspects your system. Tanks, brass and copper fittings and lines may have been damaged from the heat and be unsafe. If fire burned the tank, the pressure relief valve probably opened and released the contents.
- If you have a heating oil tank system, contact a heating oil supplier for an inspection of your system before using. The tank may have shifted or fallen from the stand and fuel lines may have kinked or weakened. Heat from the fire may have caused the tank to warp or bulge. Nonvented tanks are more likely to bulge or show signs of stress. The fire may have loosened or damaged fittings and filters.
- Visually check the stability of the trees. Any tree that has been weakened by fire may be a hazard. Winds are normally responsible for toppling weakened trees. The wind patterns in your area may have changed as a result of the loss of adjacent tree cover.
  - Look for burns on the tree trunk. If the bark on the trunk has been burned off or scorched by very high temperatures completely around the circumference, the tree will not survive. Where fire has burnt deep into the trunk, the tree should be considered unstable.
  - Look for burnt roots by probing the ground with a rod around the base of the tree and several feet away from the base. Roots are generally six to eight inches below the surface. If the roots have been burned, you should consider this tree very unstable, and it may be toppled by wind.
  - A scorched tree is one that has lost part or all of its leaves or needles. Healthy deciduous trees are resilient and may produce new branches and leaves as well as sprouts at the base of the tree. Evergreen trees may survive when partially scorched. An evergreen tree that has been damaged by fire is subject to bark beetle attack. Please seek professional assistance from the forestry service concerning measures for protecting evergreens from bark beetle attack.

Drinking Water

- Wells at undamaged homes should be safe, unless affected by a fuel spill. If you are in doubt of water safety, contact your local public health officials.
- If your house was damaged, disinfect and test water before consumption. The water system may have become contaminated with bacteria due to loss of water pressure in the plumbing.
- If you use water from a public well, have a water sample collected and tested before allowing the water to be consumed. Water may have been contaminated with bacteria due to a loss of water pressure in the plumbing.



Winter Storm

Produced by the National Disaster Education Coalition: American Red Cross, FEMA, IAEM, IBHS, NFPA, NWS, USDA/CSREES, and USGS

Why talk about winter storms?

A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. People can become trapped at home, without utilities or other services. Heavy snowfall and blizzards can trap motorists in their cars. Attempting to walk for help in a blizzard can be a deadly decision.

Winter storms can make driving and walking extremely hazardous. The aftermath of a winter storm can have an impact on a community or region for days, weeks, or even months. Storm effects such as extremely cold temperatures and snow accumulation, and sometimes coastal flooding, can cause hazardous conditions and hidden problems for people in the affected area.

What are winter storms, and what causes them?

A winter storm can range from a moderate snow over a few hours to blizzard conditions with blinding wind-driven snow that lasts several days. Some winter storms may be large enough to affect several states, while others may affect only a single community. Many winter storms are accompanied by low temperatures and heavy and/or blowing snow, which can severely reduce visibility.

A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. People can become trapped at home, without utilities or other services.

Winter storms can be defined differently in various parts of the country. Heavy snow in the south can be a dusting in the mountains. Check with your local emergency management office, National Weather Service (NWS) office, or local American Red Cross for terms and definitions specific to your area.

Sleet is raindrops that freeze into ice pellets before reaching the

ground. Sleet usually bounces when hitting a surface and does not stick to objects; however, it can accumulate like snow and cause a hazard to motorists. Freezing rain is rain that falls onto a surface with a temperature below freezing; this causes it to freeze to surfaces, such as trees, cars, and roads, forming a glaze of ice. Even small accumulations of ice can cause a significant hazard. An ice storm occurs when freezing rain falls and freezes immediately on impact; communications and power can be disrupted for days, and even small accumulations of ice may cause extreme hazards to motorists and pedestrians.

Learn about winter storm risk in your area. Contact your local emergency management office, National Weather Service office, or American Red Cross chapter for more information.

Awareness Information

Know what winter storm and blizzard WATCHES and WARNINGS mean.

- A National Weather Service WATCH is a message indicating that conditions favor the occurrence of a certain type of hazardous weather. For example, a severe thunderstorm watch means that a severe thunderstorm is expected in the next six hours or so within an area approximately 120 to 150 miles wide and 300 to 400 miles long (36,000 to 60,000 square miles). The NWS Storm Prediction Center issues such watches. Local NWS forecast offices issue other watches (flash flood, winter weather, etc.) 12 to 36 hours in advance of a possible hazardous-weather or flooding event. Each local forecast office usually covers a state or a portion of a state.
- An NWS WARNING indicates that a hazardous event is occurring or is imminent in about 30 minutes to an hour. Local NWS forecast offices issue warnings on a county-by-county basis.
- A winter storm WATCH means a winter storm is possible in your area.
- A winter storm WARNING means a winter storm is occurring, or will soon occur, in your area.
- A blizzard WARNING means sustained winds or frequent gusts to 35 miles per hour or greater and considerable falling or blowing snow (reducing visibility to less than a quarter mile) are expected to prevail for a period of three hours or longer.

Winter storms are considered deceptive killers because most deaths are indirectly related to the storm. The leading cause of death during winter storms is from automobile or other transportation accidents. Exhaustion and heart attacks caused by overexertion are the two most likely causes of winter storm-related deaths. Elderly people account for the largest percentage of hypothermia victims. Many older Americans literally "freeze to death" in their own homes after being exposed to dangerously cold indoor temperatures, or are asphyxiated because of improper use of

fuels such as charcoal briquettes, which produce carbon monoxide.

House fires occur more frequently in the winter due to lack of proper safety precautions when using alternate heating sources (unattended fires, disposal of ashes too soon, improperly placed space heaters, etc.). Fire during winter storms presents a great danger because water supplies may freeze and it may be difficult for firefighting equipment to get to the fire.

Plan for a Winter Storm

Develop a Family Disaster Plan. Please see the "Family Disaster Plan" section for general family planning information. Develop a winter storm–specific plan. Learn about your area's winter storm risk. Different areas have different risks associated with winter storms. Contact your local Red Cross chapter, emergency management office, or local National Weather Service office about your area's winter storm risk.

If you are at risk from winter storms:

- Understand the hazards of wind chill, which combines the cooling effect of wind and cold temperatures on exposed skin. As the wind increases, heat is carried away from a person's body at an accelerated rate, driving down the body temperature. "Wind chill" is a calculation of how cold it feels when the effects of wind speed and temperature are combined. A strong wind combined with a temperature of just below freezing can have the same effect as a still air temperature about 35 degrees colder.
- Service snow removal equipment before winter storm season. Equipment should be available for use if needed. Maintain it in good working order.
- Keep your car's gas tank full for emergency use and to keep the fuel line from freezing.
- Get training. Take an American Red Cross first aid course to learn how to treat exposure to the cold, frostbite, and hypothermia.
- Discuss with your family what to do if a winter storm WATCH or WARNING is issued. Designate one household member as the winter storm preparedness leader. Have him or her discuss what to do if a winter storm watch or warning is issued. Have another household member state what he or she would do if caught outside or in a vehicle during a winter storm. Everyone should know what to do in case all family members are not together. Discussing winter storms ahead of time helps reduce fear and lets everyone know how to respond during a winter storm.

What to Tell Children

- The best way to stay safe in a snowstorm is to stay inside. Long periods of exposure to severe cold increases the risk of frostbite or

hypothermia. Also, it is easy to become disoriented in blowing snow.

- If you go outside to play after a snowstorm, dress in many layers and wear a hat and mittens. Many layers of thin clothing are warmer than single layers of thick clothing. One of the best ways to stay warm is to wear a hat; most body heat is lost through the top of the head. Keep hands and feet warm too. Mittens are warmer than gloves. Covering the mouth with a scarf protects lungs from extremely cold air.
- Come inside often for warm-up breaks. Long periods of exposure to severe cold increases the risk of frostbite or hypothermia.
- If you start to shiver a lot or get very tired, or if your nose, fingers, toes, or earlobes start to feel numb or turn very pale, come inside right away and tell an adult. These are signs of hypothermia and frostbite. If you experience these symptoms, you will need immediate attention to prevent further risk.

Assemble a Disaster Supplies Kit

Please see the section "Disaster Supplies Kit" for general supplies kit information. Winter storm–specific supplies should include the following:

- A warm coat, gloves or mittens, hat, and water-resistant boots for each member of the family.
- Extra blankets and extra warm clothing.
- Nonclumping kitty litter. Kitty litter will generate temporary traction. Rock salt will melt ice on walkways but can damage vegetation and concrete. Other, less damaging, ice melting products are available from building supplies stores.
- Disaster Supplies Kit basics.

How to Protect Your Property

- Make sure your home is properly insulated. If necessary, insulate walls and attic. This will help you to conserve electricity and reduce your home's power demands for heat. Caulk and weather-strip doors and windowsills to keep cold air out, allowing the inside temperature to stay warmer longer.
- Install storm windows or cover windows with plastic from the inside. This will provide an extra layer of insulation, keeping more cold air out.
- To keep pipes from freezing:
  - Wrap pipes in insulation or layers of old newspapers.
  - Cover the newspapers with plastic to keep out moisture.
  - Let faucets drip a little to avoid freezing.
  - Know how to shut off water valves.
- If the pipes freeze, remove any insulation or layers of newspapers and wrap pipes in rags. Completely open all faucets and pour hot water over the pipes, starting where they were most

exposed to the cold (or where the cold was most likely to penetrate). A hand-held hair dryer, used with caution to prevent overheating, also works well.

- Consider storing sufficient heating fuel. Regular fuel sources may be cut off. Be cautious of fire hazards when storing any type of fuel.
- Before winter, be sure you install and check smoke alarms.
- Consider keeping safe emergency heating equipment:
  - Fireplace with ample supply of wood.
  - Small, well-vented wood, coal, or camp stove with fuel.
  - Portable space heater or kerosene heater. Check with your local fire department on the legality of using kerosene heaters in your community. Use only the correct fuel for your unit and follow the manufacturer's instructions. Refuel outdoors only, and only when cool. Keep your kerosene heater at least three feet away from furniture and other flammable objects.
- When using alternative heat from a fireplace, wood stove, space heater, etc., use fire safeguards and ventilate properly. Fire hazard is greatly increased in the winter because alternate heating sources are used without following proper safety precautions.
- Install snow fences in rural areas to reduce drifting in roads and paths, which could block access to homes, barns, and animals' feed and water.
- If you live in a flood-prone area, consider purchasing flood insurance to cover possible flood damage that may occur during the spring thaw. Homeowners' policies do not cover damage from floods. Ask your insurance agent about the National Flood Insurance Program if you are at risk.

Media and Community Education Ideas

- Sponsor a "Winter Weather Awareness Day" or week just before winter storm season. This is a good way to get emergency management officials and local Red Cross representatives involved.
- Publish a special section in your local newspaper with emergency information about winter storms. Place special emphasis on what people should do if they are caught out in the open or in a vehicle.
- Inform your community about the different National Weather Service announcements — winter storm watch, winter storm warning, ice storm warning, heavy snow warning, blizzard warning, severe blizzard warning, and high wind warning.

- Conduct a series of presentations at the beginning of the winter storm season. Include information on alternative heat sources and home insulation.
- Interview local physicians about the dangers of hypothermia and other winter health conditions. Include discussions of exhaustion and heart attacks caused by overexertion.
- Advise people of the dangers of winter driving, and warn them driving in winter storms can be a risk to their lives. Produce a series of announcements on what to do if you are stuck in your car during a blizzard.

What to Do Before a Winter Storm

- Use a NOAA Weather Radio with a tone-alert feature to keep you informed of watches and warnings issued in your area. The tone alert feature will automatically alert you when a watch or warning is issued.
- Contact your local emergency management office or American Red Cross for information on designated public shelters in case you lose power or heat.

What to Do During a Winter Storm WATCH

- Listen to a NOAA Weather Radio, or local radio or television stations for updated information. Local authorities will provide you with the best information for your particular situation.
- Be aware of changing weather conditions. Severe weather can happen quickly. Temperatures may drop rapidly, winds may increase or snow may fall at heavier rates. What is happening where you are may not agree with local forecasts.
- Move animals to sheltered areas. Have a water supply available. Most animal deaths in winter storms are from dehydration.
- Avoid unnecessary travel. Your safest place during a winter storm is indoors. About 70 percent of winter deaths related to ice and snow occur in automobiles.

What to Do During a Winter Storm WARNING or a Blizzard WARNING

- Stay indoors and dress warmly during the storm. Wearing layers of loose-fitting, lightweight, warm clothing will keep you warmer than one bulky sweater. Remove layers to avoid overheating, perspiration and subsequent chill.

- Listen to a battery-powered radio or television for updated emergency information. If the power goes out, you will still have access to important information.
- Eat regularly. Food provides the body with energy for producing its own heat.
- Keep the body replenished with fluids to prevent dehydration. Drink liquids such as warm broth or juices. Avoid caffeine and alcohol. Caffeine, a stimulant, accelerates the symptoms of hypothermia. Alcohol, such as brandy, is a depressant and hastens the effects of cold on the body. Alcohol also slows circulation and can make you less aware of the effects of cold. Both caffeine and alcohol can cause dehydration.
- Conserve fuel. Winter storms can last for several days. Great demand may be placed on electric, gas, and other fuel distribution systems (fuel oil, propane, etc.). Suppliers of propane and fuel oil may not be able to replenish depleted supplies during severe weather. Electric and gas services may be temporarily disrupted when many people demand large amounts at the same time. Lower the thermostat to 65°F during the day and 55°F at night. Close off unused rooms, and stuff towels or rags in cracks under doors. Cover windows at night.
- If you must go outside, protect yourself from winter storm hazards.
    - Wear layered clothing, mittens or gloves, and a hat. Layering clothes will keep you warmer than a single heavy coat. Outer garments should be tightly woven and water repellent. Mittens or gloves and a hat will prevent loss of body heat. Mittens are warmer than gloves because fingers maintain more warmth when they touch each other. Half of your body heat loss is from the head.
    - Cover your mouth to protect your lungs from extremely cold air. Avoid taking deep breaths; minimize talking.
    - Watch for signs of hypothermia and frostbite. Frostbite is a severe reaction to cold exposure that can cause permanent harm to people. A loss of feeling and a white or pale appearance in fingers, toes, nose, or earlobes are symptoms of frostbite. Hypothermia is a condition brought on when the body temperature drops to less than 95°F. Symptoms of hypothermia include uncontrollable shivering, slow speech, memory lapses, frequent stumbling, drowsiness, and exhaustion. Hypothermia is not always fatal, but for those who survive there are likely to be lasting kidney, liver, and pancreas problems.

      If frostbite or hypothermia is suspected, begin warming the person

slowly and seek immediate medical assistance. Warm the person's trunk first. Using your own body heat will help. Arms and legs should be warmed last because stimulation of the limbs can drive cold blood toward the heart and lead to heart failure. Put the person in dry clothing and wrap their entire body in a blanket. Never give a frostbite or hypothermia victim alcohol or something with caffeine in it, like coffee or tea. Caffeine, a stimulant, can cause the heart to beat faster and hasten the effect the cold has on the body. Alcohol, a depressant, can slow the heart and also hasten the ill effects of the cold.

  - Keep dry. Change wet clothing frequently to prevent a loss of body heat. Wet clothing loses much of its insulating value and transmits heat rapidly away from the body.
  - Stretch before you go out. If you go out to shovel snow, do a few stretching exercises to warm up your body. This will reduce your chances of muscle injury.
  - Avoid overexertion, such as shoveling heavy snow, pushing a car or walking in deep snow. The strain from the cold and the hard labor may cause a heart attack. Sweating could lead to a chill and hypothermia.
  - Walk carefully on snowy, icy sidewalks. Slips and falls occur frequently in winter weather, resulting in painful and sometimes disabling injury.

- If you must go out during a winter storm, use public transportation if possible. About 70 percent of winter deaths related to ice and snow occur in automobiles.

Winter Driving

- Have your car(s) winterized before the winter storm season. Keeping your car(s) in good condition will decrease your chance of being stranded in cold weather. Have a mechanic check your battery, antifreeze, wipers and windshield washer fluid, ignition system, thermostat, lights, flashing hazard lights, exhaust system, heater, brakes, defroster, and oil level. If necessary, replace existing oil with a winter grade oil. Install good winter tires. Make sure the tires have adequate tread. All-weather radials are usually adequate for most winter conditions. However, some jurisdictions require that to drive on their roads, vehicles must be equipped with chains or snow tires with studs.
- If you have a cell phone or two-way radio available for your use, keep the battery charged and keep it with you whenever traveling in winter weather. If you should become stranded, you will be able to call for help, advising rescuers of your location.

- Keep a windshield scraper and small broom in your car for ice and snow removal.
- Put together a separate disaster supplies kit for the trunk of each car used by members of your household. You should also bring a thermos of warm broth if you are on the road during a winter storm. If you should become stranded during a winter storm, these items will make you more comfortable until the storm passes. The kit should include the following:
  - Several blankets or sleeping bags.
  - Rain gear and extra sets of dry clothing, mittens, socks, and a wool cap.
  - Extra newspapers for insulation.
  - Plastic bags for sanitation.
  - Canned fruit, nuts, and high energy "munchies." Non-electric can opener if necessary.
  - Several bottles of water. Eating snow will lower your body temperature. If necessary, melt it first.
  - Cans of broth or soup.
  - A small shovel, a pocket knife, and small tools, such as pliers, a wrench, and screwdriver.
  - A small sack of sand for generating traction under wheels, a set of tire chains or traction mats.
  - Jumper cables.
  - A first aid kit and necessary medications.
  - A flashlight with extra batteries.
  - A candle in a metal can or other fireproof container. While candles are generally not recommended in disaster situations, having one in your car can be a source of heat and light if you are stranded.
  - Matches.
  - Cards, games, and puzzles.
  - A brightly colored cloth to tie to the antenna.
- Keep your car's gas tank full for emergency use and to keep the fuel line from freezing.
- Plan long trips carefully. Traveling during winter weather can be hazardous. Listen to the radio or call the state highway patrol for the latest road conditions. Plan to travel during daylight and, if possible, take at least one other person.

- Let someone know your destination, your route, and when you expect to arrive. If your car gets stuck along the way, help can be sent along your predetermined route.
- Be aware of sleet, freezing rain, freezing drizzle, and dense fog, which can make driving very hazardous. The leading cause of death during winter storms is from automobile or other transportation accidents. During winter weather conditions, multiple vehicle accidents are more likely to occur, resulting in injury and death. Avoid driving during sleet, freezing rain, freezing drizzle, and dense fog — these serious conditions are often underestimated.
- If you do get stuck:
  - Stay with your vehicle. Do not leave the vehicle to search for assistance unless help is visible within 100 yards. Disorientation and confusion come very quickly in blowing snow. Avoid traveling during winter storms. If you must travel and do become stranded, it is better to stay in the vehicle and wait for help.
  - Display a trouble sign to indicate you need help. Hang a brightly colored cloth (preferably red) on the radio antenna and raise the hood (after snow stops falling).
  - Occasionally run engine to keep warm. Carbon monoxide can build up inside a standing vehicle while the engine is running, even if the exhaust pipe is clear. Experience has shown that running the heater for 10 minutes every hour is enough to keep occupants warm and will reduce the risk of carbon monoxide poisoning and conserve fuel. Turn on the engine for about 10 minutes each hour (or 5 minutes every half hour). Use the heater while the engine is running. Keep the exhaust pipe clear of snow and slightly open a downwind window for ventilation.
  - Leave the overhead light on when the engine is running so that you can be seen.
  - Do minor exercises to keep up circulation. Clap hands and move arms and legs occasionally. Try not to stay in one position for too long.
  - If more than one person is in the car, take turns sleeping. One of the first signs of hypothermia is sleepiness. If you are not awakened periodically to increase body temperature and circulation, you can freeze to death.
  - Huddle together for warmth.
  - Use newspapers, maps, and even the removable car mats for added insulation. Layering items will help trap more body heat.

- Keep a window that is away from the blowing wind slightly open to let in air.
- Watch for signs of frostbite and hypothermia. Severe cold can cause numbness, making you unaware of possible danger. Keep fingers and toes moving for circulation, huddle together, and drink warm broth to reduce risk of further injury.
- Drink fluids to avoid dehydration. Bulky winter clothing can cause you to sweat, but cold dry air will help the sweat evaporate, making you unaware of possible dehydration. When individuals are dehydrated, they are more susceptible to the effects of cold and heart attacks. Melt snow before using it for drinking water. Eating snow lowers your body temperature, increasing risk from hypothermia.
- Avoid overexertion. Cold weather puts an added strain on the heart. Unaccustomed exercise such as shoveling snow or pushing a car can bring on a heart attack or make other medical conditions worse.

What to Do After a Winter Storm

- Continue listening to local radio or television stations or a NOAA Weather Radio for updated information and instructions. Access may be limited to some parts of the community, or roads may be blocked.
- Help a neighbor who may require special assistance — infants, elderly people, and people with disabilities. Elderly people and people with disabilities may require additional assistance. People who care for them or who have large families may need additional assistance in emergency situations.
- Avoid driving and other travel until conditions have improved. Roads may be blocked by snow or emergency vehicles.
- Avoid overexertion. Heart attacks from shoveling heavy snow are a leading cause of deaths during winter.
- Follow forecasts and be prepared when venturing outside. Major winter storms are often followed by even colder conditions.

Bibliography

American Red Cross. *Against the Wind: Protecting Your Home from Hurricane Wind Damage.* Washington, D.C.: The American National Red Cross, 1994.

American Red Cross. *Are You Ready for an Earthquake?* Washington, D.C.: The American National Red Cross, 1998.

American Red Cross. *Are You Ready for a Fire?* Washington, D.C.: The American National Red Cross, 1998.

American Red Cross. *Are You Ready for a Flood?* Washington, D.C.: The American National Red Cross, 1998.

American Red Cross. *Are You Ready for a Heat Wave?* Washington, D.C.: The American National Red Cross, 1998.

American Red Cross. *Are You Ready for a Hurricane?* Washington, D.C.: The American National Red Cross, 1998.

American Red Cross. *Are You Ready for a Thunderstorm?* Washington, D.C.: The American National Red Cross, 1998.

American Red Cross. *Are You Ready for a Tornado?* Washington, D.C.: The American National Red Cross, 1998.

American Red Cross. *Are You Ready for a Winter Storm?* Washington, D.C.: The American National Red Cross, 1998.

American Red Cross. *Can You Afford to Lose Everything You Own?* Washington, D.C.: The American National Red Cross, 1994.

American Red Cross. *Community Disaster Education Instructor Specialty Course Instructor's Manual.* Washington, D.C.: The American National Red Cross, 1994.

American Red Cross. *Community Disaster Education Presenter's Resource.* Washington, D.C.: The American National Red Cross, 1996.

American Red Cross. *Disaster Preparedness for People with Disabilities.* Washington, D.C.: The American National Red Cross, 1996.

American Red Cross. *Safe Steps for Winter Weather.* Washington, D.C.: The American National Red Cross, 1994.

American Red Cross. *Your Guide to Home Chemical Safety and Emergency Procedures.* Washington, D.C.: The American National Red Cross, 1994.

American Red Cross and the Humane Society of the United States. *Pets and Disasters: Get Prepared.* Washington, D.C.: The American National Red Cross, 1996.

California Office of Emergency Services. *Living on Shaky Ground.* Arcata, California: (undated).

Federal Emergency Management Agency and the American Red Cross. *Disaster Supplies Kit.* Washington, D.C., 1992.

Federal Emergency Management Agency and the American Red Cross. *Family Disaster Plan.* Washington, D.C., 1992.

Federal Emergency Management Agency and the American Red Cross. *Food and Water in an Emergency.* Washington, D.C., 1994.

Federal Emergency Management Agency and the American Red Cross. *Wildfire: Are You Prepared?* Washington, D.C., 1993.

Hall, John R. *U.S. Experience With Smoke Detectors and Other Fire Detectors: Who Has Them? How Well Do They Work? When Don't They Work?* Quincy, Massachusetts: National Fire Protection Association, June 1998.

Hall, John R. *U.S. Experience With Sprinklers: Who Has Them? How Well Do They Work?* Quincy, Massachusetts: National Fire Protection Association, June 1998.

Hall, John R. *The U.S. Fire Problem Overview Report Through 1995. Leading Causes and Other Patterns and Trends.* Quincy, Massachusetts: National Fire Protection Association, December 1997.

Home Fire Sprinkler Coalition. *Home Fire Sprinklers.* Quincy, Massachusetts: 1997.

Humboldt Earthquake Education Center, Humboldt State University. *On Shaky Ground*. Humboldt, California: (undated).

Karter, Michael J., Jr. *U.S. Fire Experience by Region — 1989–1995*. Quincy, Massachusetts: National Fire Protection Association, March 1997.

Lopes, Rocky. *Public Perception of Presentations Using Disaster Damage Images.* Boulder, Colorado: Institute of Behavioral Sciences, The University of Colorado, 1992.

Lystad, Mary Hanemann. *Children's Reactions to Disaster: Family Implications.* Rockville, Maryland: National Institute of Mental Health, 1987.

Miller, Alison L. *The U.S. Home Product Report, 1987–1991 — Forms and Types of Materials First Ignited in Fires.* Quincy, Massachusetts: National Fire Protection Association, February 1994.

National Fire Protection Association. *10 Tips for Fire Safety*. Quincy, Massachusetts: NFPA, 1995.

National Fire Protection Association. *E.D.I.T.H. Exit Drills in the Home.* Quincy, Massachusetts: NFPA, 1995.

National Fire Protection Association. *Fire in Your Home.* Quincy, Massachusetts: NFPA, 1997.

National Fire Protection Association. *Fire Prevention All Over Your Home.* Quincy, Massachusetts: NFPA, 1997.

National Fire Protection Association. *Hazardous Materials in the Home.* Quincy, Massachusetts: NFPA, 1996.

National Fire Protection Association. *Heating Without Getting Burned.* Quincy, Massachusetts: NFPA, 1995.

National Fire Protection Association. *Home Portable Fire Extinguishers.* Quincy, Massachusetts: NFPA, 1996.

National Fire Protection Association. *Kitchen Fire Safety.* Quincy, Massachusetts: NFPA, 1996.

National Fire Protection Association. *Match and Lighter Safety.* Quincy, Massachusetts: NFPA, 1995.

National Fire Protection Association. *National Fire Alarm Code* (NFPA72). Quincy, Massachusetts: NFPA, 1988.

National Fire Protection Association. *Preventing Burns at Home.* Quincy, Massachusetts: NFPA, 1996.

National Fire Protection Association. *Special Data Information Package Socioeconomic Factors Studies.* Quincy, Massachusetts: NFPA, 1993.

National Oceanic and Atmospheric Administration. *The Naming of Hurricanes.* Miami, Florida: National Hurricane Center, 1996.

National Oceanic and Atmospheric Administration. *NOAA Weather Radio.* Silver Spring, Maryland: National Weather Service, 1996.

National Oceanic and Atmospheric Administration. *Severe Local Storm Spotter Reporting Procedures.* Washington, D.C.: National Weather Service, 1988.

National Oceanic and Atmospheric Administration. *Tsunami! The Great Waves.* Washington, D.C.: National Weather Service, 1975.

National Oceanic and Atmospheric Administration and the American Red Cross. *Flash Floods and Floods...The Awesome Power.* Silver Spring, Maryland: 1993.

National Oceanic and Atmospheric Administration and the American Red Cross. *Hurricanes...The Underrated Killers.* Silver Spring, Maryland: 1996.

National Oceanic and Atmospheric Administration and the American Red Cross. *Thunderstorms and Lightning — The Underrated Killer.* Silver Spring, Maryland: 1993.

National Oceanic and Atmospheric Administration and American Red Cross. *Tornadoes — Nature's Most Violent Storm*. Silver Spring, Maryland: 1993.

National Oceanic and Atmospheric Administration and American Red Cross. *Winter Storms — The Deceptive Killers.* Silver Spring, Maryland: 1992.

Parker, Stanley D.; Brewer, Marilynn B.; and Spencer, Janie R. "Natural Disaster, Perceived Control, and Attributions to Fate." *Personality and Social Psychology Bulletin 6,* (September 1980): 454–459.

United States Consumer Product Safety Commission. *Fire Incident Study National Smoke Detector Project.* Bethesda, Maryland: January, 1995.

United States Geological Survey. *Building Safer Structures.* Reston, Virginia: 1995.

United States Geological Survey. *Earthquakes.* Reston, Virginia: 1994.

United States Geological Survey. *Living on Active Volcanoes — The Island of Hawaii.* Reston, Virginia: 1997.

United States Geological Survey. *Living With Volcanic Risk in the Cascades.* Reston, Virginia: 1997.

United States Geological Survey. *National Landslide Information Center.* Denver, Colorado: (undated).

United States Geological Survey. *The Next Big Earthquake.* Anchorage, Alaska: (undated).

United States Geological Survey. *Putting Down Roots in Earthquake Country.* Reston, Virginia: 1997.

United States Geological Survey. *Saving Lives Through Better Design Standards.* Reston, Virginia: 1995.

United States Geological Survey. *Southern Californians Cope With Earthquakes.* Reston, Virginia: 1995.

United States Geological Survey. *Stream Gauging and Flood Forecasting.* Reston, Virginia: 1995.

United States Geological Survey. *Volcanic Ash — Danger to Aircraft in the North Pacific?* Reston, Virginia: 1997.

United States Geological Survey. *What Are Volcano Hazards?* Reston, Virginia: 1997.

Resources

For further information, brochures, and materials, you may contact:

Your local American Red Cross chapter

Your local Emergency Management Agency

Your local National Weather Service office

Your state geological survey office

U.S. Geological Survey's Earthfax (automated fax system), (703) 648-4888

National Fire Protection Association, (617) 770-3000

The Federal Emergency Management Agency's Publication Warehouse, (800) 480-2520

or check out these websites:

American Red Cross	www.redcross.org
Federal Emergency Management Agency	www.fema.gov
Institute for Business and Home Safety	www.ibhs.org
International Association of Emergency Managers	www.iaem.com
National Fire Protection Association	www.nfpa.org
National Weather Service	www.nws.noaa.gov
U.S. Department of Agriculture Cooperative State Research, Education, and Extension Service	www.reeusda.gov
U.S. Geological Survey	www.usgs.gov

Index