Federal Emergency Management Agency

Washington, D.C.

Dear Citizens,

We live in a different world than we did before September 11, 2001. We are more aware of our vulnerabilities, more appreciative of our freedoms and more understanding that we have a personal responsibility for the safety of our families, our neighbors and our nation.

Are You Ready? A Guide to Citizen Preparedness provides practical information on how your family can prepare for any disaster. It includes up-to-date hazard specific safety tips and information about preparedness and protection. In addition to information on most natural and technological disasters, there are new chapters on "Animals in Disaster," "Extreme Heat (Heat Wave)," "Landslide & Debris Flow (Mudslide)," "Emergency Water Shortages," and newly updated information on terrorism.

We know that disaster preparedness works. We can take action now that will help protect our families, reduce the impact an emergency has on our lives, and deal with the chaos if an incident occurs near us. These actions are at the heart of everything we do at FEMA, and they are the reason President George W. Bush established Citizen Corps, a nationwide initiative encompassing public education, citizen training and volunteer programs. FEMA's vision of a nation prepared is best achieved by your participation in community and family preparedness so that we are all better protected for every disaster.

Contact your local emergency management office for information about specific hazards in your area and to volunteer to help make your community better prepared.

We know that disaster can strike at any time. We all have a personal responsibility to be ready.

Sincerely,

Joe M. Allbaugh
Director

Acknowledgement

This guide has been prepared for direct dissemination to the general public and is based on the most reliable hazard awareness and emergency education information available at the time of publication, including advances in scientific knowledge, more accurate technical language, and the latest physical research on what happens in disasters.

This publication is, however, too brief to cover every factor, situation, or difference in buildings, infrastructure, or other environmental features that might be of interest. To help you explore your interest further, additional sources of information have been compiled in the "For More Information" chapter, beginning on page 97.

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Why Prepare for a Disaster?

Disasters disrupt hundreds of thousands of lives every year. Each disaster has lasting effects—people are seriously injured, some are killed, and property damage runs into the billions of dollars.

If a disaster occurs in your community, local government and disaster-relief organizations try to help you. But you need to be ready as well. Local responders may not be able to reach you immediately, or they may need to focus their efforts elsewhere.

Being prepared and understanding what to do can reduce fear, anxiety and losses that accompany disasters. Communities, families and individuals should know what to do in a fire and where to seek shelter in a tornado. They should be ready to evacuate their homes, take refuge in public shelters and know how to care for their basic medical needs.

People can also reduce the impact of disasters (flood proofing, elevating a home—or relocating a home out of harm's way, securing items that could shake loose in an earthquake) and sometimes avoid the danger altogether.

You should know how to respond to severe weather or any disaster that could occur in your area—hurricanes, earthquakes, extreme cold, flooding, or an act of terrorism. You should also be ready to be self sufficient for at least three days. This may mean providing for your own shelter, first aid, food, water and sanitation.

This guide can help. It was developed by the Federal Emergency Management Agency (FEMA), the agency responsible for responding to national disasters and for helping state and local governments and individuals prepare for emergencies. It contains step-by-step advice on how to prepare for, respond to and recover from disasters.

While this guide focuses on the physical hazards of disasters, there are also the emotional effects of losing a loved one, a home, or treasured possessions. When under stress, people can become irritable, fatigued, hyperactive, angry and withdrawn. Children and older adults are especially vulnerable to post-disaster psychological effects.

Share this reference with your household. Include everyone in the planning process. Teach children how to respond to emergencies. Give them a sense of what to expect. Being prepared, understanding your risks and taking steps to reduce those risks can reduce the damages caused by hazards.

What You Should Do

First, ask your local emergency management office which disasters could strike your community. They will know your community's risks. You may be aware of some of them; others may surprise you. Also ask for any information that might

help you prepare and possibly reduce the risks you face. Then, refer to the appropriate chapters in this handbook. Each chapter covers a specific hazard and describes how to prepare and what to do when the disaster occurs.

Next, review the "Evacuation," "Shelter," "Emergency Planning and Disaster Supplies" and "Recovering From Disaster" chapters. These chapters apply to a range of hazards including some not specifically addressed in this publication.

Use this guide as your foundation for disaster preparedness and safety. Since special conditions exist in every community, local instructions may be slightly different from those described in this guide. If so, follow local instructions.

Consider getting involved in local emergency preparedness and response activities by volunteering in your community. One way is to participate as a Citizen Corps community volunteer. See the "For More Information" chapter for details on Citizen Corps and FEMA's Community Emergency Response Team (CERT) program.

General Preparedness Information

EMERGENCY PLANNING AND DISASTER SUPPLIES

EVACUATION

SHELTER

MITIGATION

ANIMALS IN DISASTER

RECOVERING FROM DISASTER

Emergency Planning and Disaster Supplies

Emergency Planning

Immediately after an emergency, essential services may be cut-off and local disaster relief and government responders may not be able to reach you right away. Even if they could reach you, knowing what to do to protect yourself and your household is essential.

This chapter describes how to prepare for any kind of disaster. It also provides specific information about emergency water and food and recommended disaster supplies kit.

Creating a disaster plan

One of the most important steps you can take in preparing for emergencies is to develop a household disaster plan.

1. Learn about the natural disasters that could occur in your community from your local emergency management office or American Red Cross chapter. Learn whether hazardous materials are produced, stored or transported near your area. Learn about possible consequences of deliberate acts of terror. Ask how to prepare for each potential emergency and how to respond.
2. Talk with employers and school officials about their emergency response plans.
3. Talk with your household about potential emergencies and how to respond to each. Talk about what you would need to do in an evacuation.
4. Plan how your household would stay in contact if you were separated. Identify two meeting places: the first should be near your home—in case of fire, perhaps a tree or a telephone pole; the second should be away from your neighborhood in case you cannot return home.
5. Pick a friend or relative who lives out of the area for household members to call to say they are okay.
6. Draw a floor plan of your home. Mark two escape routes from each room.
7. Post emergency telephone numbers by telephones. Teach children how and when to call 911.
8. Make sure everyone in your household knows how and when to shut off water, gas, and electricity at the main switches. Do not actually shut off the gas to see how it works or to show others. Only the gas company can

safely turn it back on. Consult with your local utilities if you have questions.

9. Take a first aid and CPR class. Local American Red Cross chapters can provide information. Official certification by the American Red Cross provides "good Samaritan" law protection for those giving first aid.

10. Reduce the economic impact of disaster on your property and your household's health and financial well-being.
    - Review property insurance policies before disaster strikes—make sure policies are current and be certain they meet your needs (type of coverage, amount of coverage, and hazard covered—flood, earthquake)
    - Protect your household's financial well-being before a disaster strikes—review life insurance policies and consider saving money in an "emergency" savings account that could be used in any crisis. It is advisable to keep a small amount of cash or traveler's checks at home in a safe place where you can quickly gain access to it in case of an evacuation.
    - Be certain that health insurance policies are current and meet the needs of your household.

11. Consider ways to help neighbors who may need special assistance, such as the elderly or the disabled.

12. Make arrangements for pets. Pets are not allowed in public shelters. Service animals for those who depend on them are allowed.

Assemble a disaster supply kit before disaster strikes.

Emergency planning for people with special needs

If you have a disability or special need, you may have to take additional steps to protect yourself and your household in an emergency. If you know of friends or neighbors with special needs, help them with these extra precautions. Examples include:

- Hearing impaired may need to make special arrangements to receive warnings.
- Mobility impaired people may need assistance in getting to a shelter.
- Households with a single working parent may need help from others both in planning for disasters and during an emergency.
- Non-English speaking people may need assistance planning for and responding to emergencies. Community and cultural groups may be able to help keep these populations informed.
- People without vehicles may need to make arrangements for transportation.
- People with special dietary needs should have an adequate emergency food supply.

1. Find out about special assistance that may be available in your community. Register with the office of emergency services or fire department for assistance, so needed help can be provided quickly in an emergency.

2. Create a network of neighbors, relatives, friends and co-workers to aid you in an emergency. Discuss your needs and make sure they know how to operate necessary equipment.

3. Discuss your needs with your employer.
4. If you are mobility impaired and live or work in a high-rise building, have an escape chair.
5. If you live in an apartment building, ask the management to mark accessible exits clearly and to make arrangements to help you evacuate the building.
6. Keep extra wheelchair batteries, oxygen, catheters, medication, food for guide or hearing-ear dogs, or other items you might need. Also, keep a list of the type and serial numbers of medical devices you need.
7. Those who are not disabled should learn who in their neighborhood or building is disabled so that they may assist them during emergencies.
8. If you are a care-giver for a person with special needs, make sure you have a plan to communicate if an emergency occurs.

Disaster Supply Kits

You may need to survive on your own for three days or more. This means having your own water, food and emergency supplies. Try using backpacks or duffel bags to keep the supplies together.

Assembling the supplies you might need following a disaster is an important part of your disaster plan. You should prepare emergency supplies for the following situations:

- A disaster supplies kit with essential food, water, and supplies for at least three days—this kit should be kept in a designated place and be ready to “grab and go” in case you have to leave your home quickly because of a disaster, such as a flash flood or major chemical emergency. Make sure all household members know where the kit is kept.
- Have additional supplies for sheltering or home confinement for up to two weeks.
- You should also have a disaster supplies kit at work. This should be in one container, ready to "grab and go" in case you have to evacuate the building.
- A car kit of emergency supplies, including food and water, to keep stored

in your car at all times. This kit would also include flares, jumper cables, and seasonal supplies.

The following checklists will help you assemble a disaster supplies kit that meets the needs of your household. The basic items that should be in a disaster supplies kit are water, food, first-aid supplies, tools and emergency supplies, clothing and bedding, and specialty items. You will need to change the stored water and food supplies every six months, so be sure to write the date you store it on all containers. You should also re-think your needs every year and update your kit as your household changes. Keep items in airtight plastic bags and put your entire disaster supplies kit in one or two easy-to carry containers such as an unused trash can, camping backpack or duffel bag.

Water: the absolute necessity

1. Stocking water reserves should be a top priority. Drinking water in emergency situations should not be rationed. Therefore, it is critical to store adequate amounts of water for your household.
   - Individual needs vary, depending on age, physical condition, activity, diet, and climate. A normally active person needs at least two quarts of water daily just for drinking. Children, nursing mothers, and ill people need more. Very hot temperatures can double the amount of water needed.
   - Because you will also need water for sanitary purposes and, possibly, for cooking, you should store at least one gallon of water per person per day.
2. Store water in thoroughly washed plastic, fiberglass or enamel-lined metal containers. Don't use containers that can break, such as glass bottles. Never use a container that has held toxic substances. Sound plastic containers, such as soft drink bottles, are best. You can also purchase food-grade plastic buckets or drums.
   - Containers for water should be rinsed with a diluted bleach solution (one part bleach to ten parts water) before use. Previously used bottles or other containers may be contaminated with microbes or chemicals. Do not rely on untested devices for decontaminating water.
   - If your water is treated commercially by a water utility, you do not need to treat water before storing it. Additional treatment of treated public water will not increase storage life.
   - If you have a well or public water that has not been treated, follow the treatment instructions provided by your public health service or water provider.
   - If you suspect that your well may be contaminated, contact your local or state health department or agriculture extension agent for specific advice.
   - Seal your water containers tightly to minimize the possibility of contamination, label them and store them in a cool, dark place.
   - It is important to change stored water every six months.

For water purification for immediate or near term use, please read the “Shelter” chapter of this guide.

Food: preparing an emergency supply.

1. If activity is reduced, healthy people can survive on half their usual food intake for an extended period or without any food for many days. Food, unlike water, may be rationed safely, except for children and pregnant women.

2. You don't need to go out and buy unfamiliar foods to prepare an emergency food supply. You can use the canned foods, dry mixes and other staples on your cupboard shelves. Canned foods do not require cooking, water or special preparation. Be sure to include a manual can opener.

3. Keep canned foods in a dry place where the temperature is cool. To protect boxed foods from pests and to extend their shelf life, store the food in tightly closed plastic or metal containers.

4. Replace items in your food supply every six months. Throw out any canned good that becomes swollen, dented, or corroded. Use foods before they go bad, and replace them with fresh supplies. Date each food item with a marker. Place new items at the back of the storage area and older ones in front.

5. Food items that you might consider including in your disaster supplies kit include: ready-to-eat meats, fruits, and vegetables; canned or boxed juices, milk, and soup; high-energy foods like peanut butter, jelly, low-sodium crackers, granola bars, and trail mix; vitamins; foods for infants or persons on special diets; cookies, hard candy; instant coffee, cereals, and powdered milk.

You may need to survive on your own after a disaster. Local officials and relief workers will be on the scene after a disaster, but they cannot reach everyone immediately. You could get help in hours, or it may take days. Basic services, such as electricity, gas, water, sewage treatment and telephones, may be cut off for days, even a week or longer. Or you may have to evacuate at a moment's notice and take essentials with you. You probably won't have the opportunity to shop or search for the supplies you'll need. Your household will cope best by preparing for disaster before it strikes.

First aid supplies

Assemble a first aid kit for your home and for each vehicle:

- The basics for your first aid kit should include:
  - First aid manual
  - Sterile adhesive bandages in assorted sizes
  - Assorted sizes of safety pins
  - Cleansing agents (isopropyl alcohol, hydrogen peroxide)/soap/germicide
  - Antibiotic ointment
  - Latex gloves (2 pairs)
  - Petroleum jelly
  - 2-inch and 4-inch sterile gauze pads (4-6 each size)
  - Triangular bandages (3)
  - 2-inch and 3-inch sterile roller bandages (3 rolls each)
  - Cotton balls
  - Scissors
  - Tweezers
  - Needle
  - Moistened towelettes
  - Antiseptic
  - Thermometer
  - Tongue depressor blades (2)
  - Tube of petroleum jelly or other lubricant
  - Sunscreen.
- It may be difficult to obtain prescription medications during a disaster because stores may be closed or supplies may be limited. Ask your physician or pharmacist about storing prescription medications. Be sure they are stored to meet instructions on the label and be mindful of expirations dates—be sure to keep your stored medication up to date.

- Extra pair of prescription glasses or contact lens.
- Have the following nonprescription drugs in your disaster supplies kit:
  - Aspirin and nonaspirin pain reliever
  - Antidiarrhea medication
  - Antacid (for stomach upset)
  - Syrup of ipecac (use to induce vomiting if advised by the poison control center)
  - Laxative
  - Vitamins.

Tools and emergency supplies

It will be important to assemble these items in a disaster supplies kit in case you have to leave your home quickly. Even if you don't have to leave your home, if you lose power it will be easier to have these item already assembled and in one place.

- Tools and other items:
  - A portable, battery-powered radio or television and extra batteries (also have a NOAA weather radio, if appropriate for your area)
  - Flashlight and extra batteries
  - Signal flare
  - Matches in a waterproof container (or waterproof matches)
  - Shut-off wrench, pliers, shovel and other tools
  - Duct tape and scissors
  - Plastic sheeting
  - Whistle
  - Small canister, A-B-C-type fire extinguisher
  - Tube tent
  - Compass
  - Work gloves
  - Paper, pens, and pencils
  - Needles and thread
  - Battery-operated travel alarm clock
- Kitchen items:
  - Manual can opener
  - Mess kits or paper cups, plates, and plastic utensils
  - All-purpose knife
  - Household liquid bleach to treat drinking water
  - Sugar, salt, pepper
  - Aluminum foil and plastic wrap
  - Re-sealing plastic bags
  - If food must be cooked, small cooking stove and a can of cooking fuel
- Sanitation and hygiene items:
  - Washcloth and towel
  - Towelettes, soap, hand sanitizer, liquid detergent
  - Tooth paste, toothbrushes, shampoo, deodorants, comb and brush, razor, shaving cream, lip balm, sunscreen, insect repellent, contact lens solutions, mirror, feminine supplies
  - Heavy-duty plastic garbage bags and ties—for personal sanitation uses—and toilet paper
  - Medium-sized plastic bucket with tight lid
  - Disinfectant and household chlorine bleach
  - Consider including a small shovel for digging a latrine
- Household documents and contact numbers:
  - Personal identification, cash (including change) or traveler's checks, and a credit card
  - Copies of important documents: birth certificate, marriage certificate, driver's license, social security cards, passport, wills, deeds, inventory of household goods, insurance papers, immunizations records, bank and credit card account numbers, stocks and bonds. Be sure to store these in a watertight container.

- Emergency contact list and phone numbers
- Map of the area and phone numbers of place you could go
- An extra set of car keys and house keys.

Clothes and bedding

- One complete change of clothing and footwear for each household member. Shoes should be sturdy work shoes or boots. Rain gear, hat and gloves, extra socks, extra underwear, thermal underwear, sunglasses.
- Blankets or a sleeping bag for each household member, pillows.

Specialty items

Remember to consider the needs of infants, elderly persons, disabled persons, and pets and to include entertainment and comfort items for children.

- For baby
- For the elderly
- For pets
- Entertainment: books, games, quiet toys and stuffed animals.

It is important for you to be ready, wherever you may be when disaster strikes. With the checklists above you can now put together an appropriate disaster supplies kit for your household:

- A disaster supplies kit kept in the home with supplies for **at least three days;**
- Although it is unlikely that food supplies would be cut off for as long as two weeks, consider storing additional water, food, clothing and bedding other supplies to expand your supply kit to last up to two weeks.
- A work place disaster supplies kit. It is important to store a personal supply of water and food at work; you will not be able to rely on water fountains or coolers. Women who wear high-heels should be sure to have comfortable flat shoes at their workplace in case an evacuation requires walking long distances.
- A car disaster supplies kit. Keep a smaller disaster supplies kit in the trunk of you car. If you become stranded or are not able to return home, having these items will help you survive and be more comfortable until help arrives. Add items for severe winter weather during months when heavy snow or icy roads are possible—salt, sand, shovels, and extra winter clothing, including hats and gloves.

Evacuation

Evacuations are more common than many people realize. Hundreds of times each year, transportation and industrial accidents release harmful substances, forcing thousands of people to leave their homes. Fires and floods cause evacuations even more frequently. And almost every year, people along the Gulf and Atlantic coasts evacuate in the face of approaching hurricanes.

When community evacuations become necessary, local officials provide information to the public through the media. In some circumstances other warning methods, such as sirens or telephone calls, are also used. Government agencies, the American Red Cross, Salvation Army, and other disaster relief organizations provide emergency shelter and supplies. To be prepared for an emergency, you should have enough water, food, clothing and emergency supplies to last at least three days and a disaster supplies kit. In a catastrophic emergency, you might need to be self-sufficient for even longer.

Keep fuel in your car if evacuation seems likely. Gas stations may be closed during emergencies.

The amount of time you have to evacuate will depend on the disaster. If the event can be monitored, like a hurricane, you might have a day or two to get ready. However, many disasters allow no time for people to gather even the most basic necessities. This is why you should prepare now.

Planning for evacuation

1. Ask your local emergency management office about community evacuation plans. Learn evacuation routes. If you do not own a car, make transportation arrangements with friends or your local government.
2. Talk with your household about the possibility of evacuation. Plan where you would go if you had to leave the community. Determine how you would get there. In your planning, consider different levels of evacuations. In a hurricane, for example, entire counties would evacuate, while much smaller area would be affected by a chemical release.
3. Plan a place to meet your household in case you are separated from one another in a disaster. Ask a friend outside your town to be the "checkpoint" so that everyone in the household can call that person to say they are safe.
4. Find out where your children will be sent if schools are evacuated.
5. Assemble a disaster supplies kit. Include a battery-powered radio, flashlight, extra batteries, food, water and clothing. See the "Emergency Planning and Disaster Supplies" chapter for a complete list.
6. Keep fuel in your car if an evacuation seems likely. Gas stations may be closed during emergencies and unable to pump gas during power outages.
7. Know how to shut off your residence's electricity, gas and water supplies at main switches and valves. Have the tools you would need to do this (usually adjustable pipe and crescent wrenches). Do not actually shut off the gas to see how it works or to show others. Only the gas comapny can safely turn it back on.

What to do when you are told to evacuate

Listen to a battery-powered radio and follow local instructions. If the danger is a chemical release and you are instructed to evacuate immediately, gather your household and go. Take one car per household when evacuating. This will keep your household together and reduce traffic congestion and delay. In other cases, you may have time to follow these steps:

1. Gather your disaster supplies kit and other important items such as insurance and financial records. See the "Emergency Planning and Disaster Supplies" chapter for important information.
2. Wear sturdy shoes and clothing that provides some protection, such as long pants, long-sleeved shirts, and a cap.
3. Secure your home. Close and lock doors and windows. Unplug electronic equipment such as radios and televisions and small appliances such as toasters and microwaves. (Freezers and refrigerators should be left plugged in.) If a hard freeze is likely during your absence, take actions needed to prevent damage to water pipes by freezing weather, such as:
   - Turn off water main.
   - Drain faucets.
   - Turn off inside valves for external faucets and open the outside faucets to drain.
4. Turn off the main water valve and electricity, if instructed to do so.
5. Let others know where you are going.
6. Leave early enough to avoid being trapped by severe weather.
7. Follow recommended evacuation routes. Do not take shortcuts. They may be blocked. Be alert for washed-out roads and bridges. Do not drive into flooded areas. Stay away from downed power lines.

   Disaster situations can be intense, stressful, and confusing. Should an evacuation be necessary, local authorities will do their best to notify the public, but do not depend entirely on this. Often, a disaster can strike with little or no warning, providing local authorities scant time to issue an evacuation order. Also, it is possible that you may not hear of an evacuation order due to communications or power failure or not listening to your battery-powered radio. Local authorities and meteorologists could also make mistakes, including underestimating an emergency or disaster situation. In the absence of evacuation instructions from local authorities, you should evacuate if you feel you and your household are threatened or endangered. Use pre-designated evacuation routes and let others know what you are doing and your destination.

Shelter

Taking shelter is often a critical element in protecting yourself and your household in times of disaster. Sheltering can take several forms. In-place sheltering is appropriate when conditions require that you seek protection in your home, place of employment, or other location where you are located when disaster strikes. In-place sheltering may either be short-term, such as going to a safe room for a fairly short period while a tornado warning is in effect or while a chemical cloud passes. It may also be longer-term, as when you stay in your home for several days without electricity or water services following a winter storm. We also use the term "shelter" for Mass Care facilities that provide a place to stay along with food and water to people who evacuate following a disaster.

The appropriate steps to take in preparing for and implementing short-term in-place sheltering depend entirely on the emergency situation. For instance, during a tornado warning you should go to an underground room, if such a room is available. During a chemical release, on the other hand, you should seek shelter in a room above ground level. Because of these differences, short-term in-place shelter is described in the chapters dealing with specific hazards. See the chapters on "Thunderstorms" and "Hazardous Materials Incidents" for more information. The remainder of this chapter describes steps you should take to prepare for long-term in-place sheltering and for staying in a mass care shelter if you evacuate.

Long-term in-place sheltering

Sometimes disasters make it unsafe for people to leave their residence. Winter storms, floods, and landslides may temporarily isolate individual family members and make it necessary for each household to take care of its own needs until the disaster abates. Your household should be prepared to be self-sufficient for three days when utilities and access to outside supplies of food and water are disrupted.

Be sure everyone in your household knows where to find shelter from all hazards that effect your area.

1. Stay in your shelter until local authorities say it's okay to leave. The length of your stay can range from a few hours to two weeks.

2. Unless you are alone, maintain a 24-hour communications and safety watch. Take turns listening for radio broadcasts and monitor your tone-alert NOAA Weather Radio. Watch for fires.

3. Assemble an emergency toilet, if necessary.
   - Use a garbage container, pail or bucket with a snug-fitting cover. If the

container is small, use a larger container with a cover for waste disposal. Line both containers with plastic bags.

- After each use, pour or sprinkle a small amount of regular household disinfectant, such as chlorine bleach, into the container to reduce odors and germs.

Managing water supplies

Water is critical for survival. Plan to have about one gallon of water per person per day for drinking, cooking and personal hygiene. You may need more for medical emergencies.

The average person should drink between two and two-and-one-half quarts of liquids per day, but many people need more.

1. Allow people to drink according to their need. The average person should drink at least two quarts of water or other liquids per day, but many people need more. This will depend on age, physical activity, physical condition and time of year.

2. Never ration water unless ordered to do so by authorities. Drink the amount you need today and try to find more for tomorrow. Under no circumstances should a person drink less than one quart of water each day. You can minimize the amount of water your body needs by reducing activity and staying cool.

3. Drink water that you know is not contaminated first. If necessary, suspicious water, such as cloudy water from regular faucets or muddy water from streams or ponds, can be used after it has been treated. If water treatment is not possible, put off drinking suspicious water as long as possible, but do not become dehydrated.

4. In addition to stored water, other sources include:
   - Melted ice cubes.
   - Water drained from the water heater faucet, if the water heater has not been damaged.
   - Water dipped from the flush tanks (not the bowls) of home toilets. Bowl water can be used for pets.
   - Liquids from canned goods such as fruit and vegetable juices.

5. Carbonated beverages do not meet drinking-water requirements. Caffeinated drinks and alcohol dehydrate the body, which increases the need for drinking water.

6. If water pipes are damaged or if local authorities advise you, turn off the main water valves to prevent water from draining away in case the water main breaks.
   - The pipes will be full of water when the main valve is closed.
   - To use this water, turn on the faucet at the highest point in your house (which lets air into the system).
   - Then draw water, as needed, from the lowest point in your house, either a faucet or the hot water tank.

7. Unsafe water sources include:
   - Radiators.
   - Hot water boilers (home heating system).
   - Water beds (fungicides added to the water or chemicals in the vinyl may make water unsafe to use).
   - Swimming pools and spas (chemitoo

concals used in them to kill germs are centrated for safe drinking, but can be used for personal hygiene, cleaning and related uses).

Water treatment

Treat all water of uncertain purity before using it for drinking, food washing or preparation, washing dishes, brushing teeth or making ice. In addition to having a bad odor and taste, contaminated water can contain microorganisms that cause diseases such as dysentery, cholera, typhoid and hepatitis.

There are many ways to treat water. None is perfect. Often the best solution is a combination of methods. Before treating, let any suspended particles settle to the bottom, or strain them through coffee filters or layers of clean cloth.

Following are four treatment methods. The first three methods—boiling, chlorination and water treatment tablets—will kill microbes but will not remove other contaminants such as heavy metals, salts, most other chemicals and radioactive fallout. The final method—distillation—will remove microbes as well as most other contaminants, including radioactive fallout.

Boiling is the safest method of treating water.

- Boiling water kills harmful bacteria and parasites. Bringing water to a rolling boil for 1 minute will kill most organisms. Let the water cool before drinking.
- Boiled water will taste better if you put oxygen back into it by pouring it back and forth between two containers. This will also improve the taste of stored water.

Chlorination uses liquid chlorine bleach to kill microorganisms such as bacteria.

- Use regular household liquid bleach (4 to 6 percent sodium hypochlorite) that contains no soap or scents. Some containers warn, "Not For Personal Use." You can disregard these warnings if the label states sodium hypochlorite as the only active ingredient and if you use only the small quantities mentioned in these instructions.
- Add 16 drops of unscented bleach per gallon of water, stir and let stand for 30 minutes. If the water does not taste and smell of chlorine at that point, add another dose and let stand another 15 minutes. This treatment will not kill parasitic organisms.
- If you do not have a dropper, use a spoon and a square-ended strip of paper or thin cloth about 1/4 inch by 2 inches. Put the strip in the spoon with an end hanging down about 1/2 inch below the scoop of the spoon. Place bleach in the spoon and carefully tip it. Drops the size of those from a medicine dropper will drip off the end of the strip.

Water treatment "purification" tablets release chlorine or iodine. They are inexpensive and available at most sporting goods stores and some drugstores. Follow the package directions carefully. *NOTE:* People with chronic or undiagnosed liver or kidney disease may be adversely affected by iodized tablets and may experience worsened health problems as a result of ingestion. Iodized tablets are safe for healthy, physically fit adults and should be used only if you lack the supplies for boiling, chlorination and distillation.

Distillation involves boiling water and collecting the vapor that condenses back to water. The condensed vapor may include salt or other impurities.

- Fill a pot halfway with water.
- Tie a cup to the handle on the pot's lid so that the cup hangs right side up

when the lid is upside-down (make sure the cup is not dangling into the water).

- Boil for 20 minutes. The water that drips from the lid into the cup is distilled.

Managing food supplies

1. It is important to be sanitary when storing, handling and eating food.
   - Keep food in covered containers.
   - Keep cooking and eating utensils clean.
   - Keep garbage in closed containers and dispose outside. Bury garbage, if necessary. Avoid letting garbage accumulate inside, both for fire and sanitation reasons.
   - Keep hands clean. Wash frequently with soap and water that has been boiled or disinfected. Be sure to wash:
     – Before preparing or eating food.
     – After toilet use.
     – After participating in flood cleanup activities.
     – After handling articles contaminated with floodwater or sewage.
2. Carefully ration food for everyone except children and pregnant women. Most people can remain relatively healthy with about half as much food as usual and can survive without any food for several days.
3. Try to avoid foods high in fat and protein, since they will make you thirsty. Try to eat salt-free crackers, whole grain cereals and canned foods with high liquid content.
4. For emergency cooking, heat food with candle warmers, chafing dishes and fondue pots, or use a fireplace. Charcoal grills and camp stoves are for outdoor use only.
5. Commercially canned food can be eaten out of the can without warming. Before heating food in a can, remove the label, thoroughly wash the can, and then disinfect them with a solution consisting of one cup of bleach in five gallons of water, and open before heating. Re-label your cans, including expiration date, with a marker.
   - Do not eat foods from cans that are swollen, dented or corroded even though the product may look safe to eat.
   - Do not eat any food that looks or smells abnormal, even if the can looks normal.
   - Discard any food not in a waterproof container if there is any chance that it has come into contact with contaminated floodwater.
   - Food containers with screw-caps, snap-lids, crimped caps (soda pop bottles), twist caps, flip tops, snap-open, and home canned foods should be discarded if they have come into contact with floodwater because they cannot be disinfected. For infants, use **only** pre-prepared canned baby formula. Do not use powdered formulas with treated water.
6. Your refrigerator will keep foods cool for about four hours without power if it is left unopened. Add block or dry ice to your refrigerator if the electricity will be off longer than four hours.

Thawed food usually can be eaten if it is still "refrigerator cold," or re-frozen if it still contains ice crystals. To be safe, remember, "When in doubt, throw it out." Discard any food that has been at room temperature for two hours or more, and any food that has an unusual odor, color, or texture.

If you are without power for a long period:

- Ask friends to store your frozen foods in their freezers if they have electricity.
- Inquire if freezer space is available in a store, church, school, or commercial freezer that has electrical service.
- Use dry ice, if available. Twenty-five pounds of dry ice will keep a ten-cubic-foot freezer below freezing for 3-4 days. Use care when handling dry ice, and wear dry, heavy gloves to avoid injury.

Staying in a mass care shelter

The American Red Cross and Salvation Army, assisted by community and other disaster relief groups, work with local authorities to set up public shelters in schools, municipal buildings and churches. While they often provide water, food, medicine and basic sanitary facilities, you should plan to have your own supplies as well—especially water. See the "Emergency Planning and Disaster Supplies" chapter for more details.

1. Cooperate with shelter managers and others staying in the shelter. Living with many people in a confined space can be difficult and challenging.
2. Restrict smoking to designated areas that are well-ventilated. Ensure that smoking materials are disposed of safely.
3. If you go to an emergency shelter, remember that alcoholic beverages and weapons are prohibited in shelters. Pets, except for service animals, are also not allowed in public shelters. See "Animals in Disaster" chapter or contact your local humane society for additional information.

Mitigation

One of the most effective means of protection is to take steps to make your home and your household safe from the potential effects of disaster like floods, tornadoes, hurricanes and earthquakes. This is called mitigation. Ideally, mitigation measures are implemented before disaster strikes since they can help protect your household as well as your property. However, even after a disaster strikes, actions can be taken to avoid or reduce the impact of the next disaster.

1. If your home was damaged during the disaster, consider implementing mitigation measures while you repair your home.

2. Be sure that all upgrade construction projects comply with local building codes that pertain to seismic, flood, fire and wind hazards. Make sure your contractors follow the codes, including periodic building inspections of the construction.

3. If you live in a flood-prone area, consider purchasing flood insurance to reduce your risk to floods. Buying flood insurance to cover the value of a building and its contents will not only provide greater peace of mind, but will also speed recovery if a flood occurs. You can call #1-888-FLOOD29 to learn more about flood insurance.

   Also consider options for reducing your future flood losses (see *Homeowner's Guide to Retrofitting: Six Ways to Protect Your House From Flooding*, FEMA Publication # 312). The appropriate flood mitigation measure will depend upon the degree of flood risk to which your home is subject.

For moderate degrees of flooding, incorporating floodproofing techniques to meet National Flood Insurance Program criteria may be the most practical approach to flood damage reduction. These techniques include taking the following steps to protect your utilities from flood damages.

- Relocating electric, telephone and cable lines to the upper level of your home.
- Putting heating, ventilation and air conditioning units in the upper story or the attic.
- Anchoring or bolting oil tanks to prevent flotation.

If the homes within your community have a history of severe, repetitive, flooding, it may be necessary to consider more substantial measures. Consider the following measures:

- Elevate the structure to or above the Base Flood Elevation.
- Relocate the structure to a new site located outside of the 100-year floodplain, outside of any regulatory erosion zones, and in conformance with any other applicable state or local land use regulations.

In areas prone to severe flooding, it may be appropriate to work directly with your local emergency management official to develop a community-based approach. Additionally, your local representative will be able to identify potential federal, state, and/or local funding sources for the implementation of elevation, acquisition or relocation activities. For example, FEMA offers three state-administered grant programs to help States and local governments significantly reduce or permanently eliminate future flood

losses: the Hazard Mitigation Grant Program, Flood Mitigation Assistance Program and Pre-Disaster Mitigation Program. Individuals may not apply directly to the state or FEMA, but local governments or private non-profit organizations may apply on behalf of local citizens.

4. If you live in an area prone to high winds, make sure your roof is firmly secured to the main frame of the residence.

   Consider building a wind "Safe Room or Shelter" in your home to protect your household (see the "Tornadoes" section in the "Thunderstorms" chapter). There are several additional steps you can take to reduce wind damages and losses, including the following:
   - Purchase storm shutters for exterior windows and doors to protect your home against high winds.
   - When putting new roof shingles on your house, remove the old shingles, add more nails to the roof boards and use high-wind resistant shingles.
   - Add hurricane clips to your house rafters.
   - Garage door failure can lead to increased damage to other parts of the house. Wide garage doors are especially vulnerable to damage. Ask your garage door installer for a garage door rated for high winds.

5. If you live in an area likely to have an earthquake, consider the following to reduce damages and losses and to increase personal safety:
   - Inspect your foundation, or have a contractor do so, to make sure your house is bolted to the foundation.
   - Inspect your cripple wall, or have a contractor do so, and have it reinforced, if necessary.
   - Move heavy or breakable objects to low shelves.
   - Use straps or other restraints to secure tall cabinets, bookshelves, large appliances, (especially water heater, furnace, and refrigerator), and light fixtures to prevent damage and injury.

6. Determine ways to mitigate other types of hazards in your home, such as installing a fire sprinkler system.

7. Obtain information specific to your area and home. Ask local emergency management, fire and police depart-

ments, zoning and building offices, the American Red Cross, hardware dealers, home inspectors, structural engineers and architects for technical information on these and other mitigation measures.

8. Check the list of available publications from FEMA mentioned in this section and at the end of this guide.

Animals in Disaster

Disaster disrupts and affects everything in its path, including pets, livestock, and wildlife. The following section provides general guidelines for handling animals in emergency and disaster situations.

Pets in disaster

Pets need to be included in your household disaster plan since they depend on you for their safety and well being. It is important to consider and plan for your pets before disaster strikes. Consider the following preparedness measures:

1. Do not leave pets behind—there is a chance they may not survive, or get lost before you return. Do not, however, endanger yourself or your family by trying to find and gather pets during life-threatening disaster situations where you have been instructed to evacuate.

2. With the exception of service animals, pets are not typically permitted in emergency shelters for the health and safety of other occupants.

3. Find out before a disaster which local hotels and motels allow pets and where pet boarding facilities are located. Be sure to include some outside your local area in case local facilities have closed.

4. Know that most boarding facilities require veterinarian records to prove vaccinations are current.

5. Only some animal shelters will provide care for pets during emergency and disaster situations. They should be used as a last resort. Depend on friends and family or keep pets with you.

6. Be sure your pet has proper identification tags securely fastened to the collar. A current photo of your pet will assist identification should it become necessary.

Be sure to include your pets in your household disaster plan.

7. Make sure you have a secure pet carrier or leash for your pet—they may need to be restrained during tense emergency situations.

8. Assemble a disaster supplies kit for your pet. Include pet food, water, medications, veterinary records, litter box, can opener, food dishes, first

aid kit, other supplies that may not be available at a later time, and an information sheet with pet's name and such things as behavior problems. Provide the kit to whomever assumes responsibility for your pet during a disaster.

9. Call your local emergency management office, animal shelter or animal control office for further information.

Large animals in disaster

If you have large animals, such as horses, cattle, sheep, goats or pigs on your property, be sure to prepare before a disaster.

1. Evacuate animals whenever possible. Map out primary and secondary routes in advance.
2. Evacuation destinations should be prepared with, or be able to obtain, food, water, veterinary care, and handling equipment.
3. Vehicles and trailers needed for transporting and supporting each type of animal should be available along with experienced handlers and drivers. It is best to allow animals a chance to become accustomed to vehicular travel so they are less frightened and easier to move.
4. In case evacuation is not possible, animal owners must decide whether to move large animals to shelter or turn them outside. This decision should be based on the disaster type, quality and location of shelter, and the risks of turning them outside.
5. All animals should have some form of identification.

With the exception of service animals, pets are generally not permitted in emergency shelters for health reasons.

Wildlife in disaster

Disaster and life threatening situations will exacerbate the unpredictable nature of wild animals. To protect yourself and your household, learn how to deal with wildlife.

1. Be cautious approaching wild animals during emergency situations. Do not corner or try to rescue them. Wild animals will likely feel threatened and may endanger themselves by dashing off into floodwaters, fire, etc.
2. If wild animals are trapped or no natural food source is available, you can leave food appropriate to individual animals (i.e., animals could become trapped on an "island" after seeking high ground as floodwaters rise).
3. Wild animals such as snakes, opossums, and raccoons often seek refuge from floodwaters on upper levels of homes and have been known to remain after water recedes. If you encounter animals in this situation—open a window or other escape route and the animal will likely leave on its own. Do not attempt to capture or handle the animal. Should the animal stay, call your local animal control office or wildlife resource office.
4. If you see an injured or stranded animal, do not approach or attempt to help. Call your local animal control office or wildlife resource office.
5. Animal carcasses can present serious health risks. Contact your local emergency management office or health department for specific help and instructions.

Animals after disaster

Wild or stray domestic animals can pose a danger during or after many types of disaster. Remember, most animals are disoriented and displaced, too. Do not corner an animal. If an animal must be removed, contact authorities at your local animal control office or wildlife resource office.

If any animal bites you, seek immediate medical attention. If a snake bites you, try to accurately identify the type of snake so that, if poisonous, the correct anti-venom can be administered. Do not cut the wound or attempt to suck the venom out.

Certain animals may carry rabies. Although the virus is rare, care should be taken to avoid contact with stray animals and rodents. Health departments can provide information on the types of animals that carry rabies in your area. Be sure that your pet's vaccinations are current.

Rats may also be a problem during and after many types of disaster. Be sure to secure all food supplies and contact your local animal control authorities to remove any animal carcasses in the vicinity.

Food, feed and water that has been exposed to floodwaters or airborne contaminants should never be offered to animals. This type of food may harbor dangerous bacteria, molds or chemicals. Call your local veterinarian or County Extension Agent for more information.

Contact your local emergency manager for more information on animals in disaster. The American Veterinary Medical Association (www.avma.org) and the United State Department of Agriculture (www.aphis.usda.gov) can also be reached for additional information.

Recovering from Disaster

This chapter offers some general advice on steps to take after disaster strikes to begin putting your home, your community, and your life back to normal.

Health and safety

Your first concern after a disaster is your household's health and safety.

1. Be aware of new hazards created by the disaster. Watch for washed out roads, contaminated buildings, contaminated water, gas leaks, broken glass, damaged electrical wiring and slippery floors.
2. Be aware of exhaustion. Don't try to do too much at once. Set priorities and pace yourself.
3. Drink plenty of clean water. Eat well and get enough rest.
4. Wear sturdy work boots and gloves. Wash your hands thoroughly with soap and clean water often when working in debris.
5. Inform local authorities about health and safety hazards, including chemical spills, downed power lines, washed out roads, smoldering insulation or dead animals.

After an emergency, continue to listen for news on where to get help from disaster relief organizations and government agencies.

Returning to a damaged home

Returning to a damaged home can be both physically and mentally challenging. Above all, use caution.

1. Keep a battery-powered radio with you so you can listen for emergency updates.
2. Wear sturdy work boots and gloves.
3. Before going inside, walk carefully around the outside of your home and check for loose power lines, gas leaks and structural damage. If you smell gas, do not enter the home and leave immediately. Do not enter if floodwaters remain around the building. If you have any doubts about safety, have your home inspected by a professional before entering.
4. If your home was damaged by fire, do not enter until authorities say it is safe.
5. Check for cracks in the roof, foundation and chimneys. If it looks like the building may collapse, leave immediately.
6. A battery-powered flash light is the best source of light for inspecting a damaged home. CAUTION: The flashlight should be turned on outside before entering a damaged home—the battery may produce a spark that could ignite leaking gas, if present.
7. If you smell gas or hear a hissing or blowing sound, open a window and leave immediately. Turn off the main gas valve from the outside, if you can. Call the gas company from a neighbor's residence. If you shut off the gas supply at the main valve, you should contact the gas company to turn it back on.
8. Check the electrical system where visible and accessible. If you see sparks, broken or frayed wires, or if you smell hot insulation, turn off the electricity at the main fuse box or circuit breaker. If, however, you are wet, standing in water or unsure of your safety, do not

touch anything electrical. Rather, leave the building and call for help.

9. Do not use oil, gas lanterns, candles or torches for lighting inside a damaged home until you are sure there is no leaking gas or other flammable materials present. Do not smoke. Do not turn on the lights until you're sure they're safe to use.

10. Enter the home carefully and check for damage. Be aware of loose boards and slippery floors.

11. Watch out for animals, especially poisonous snakes. Use a stick to poke through debris.

12. Check appliances. If appliances are wet, turn off the electricity at the main fuse box or circuit breaker. Then unplug appliances and let them dry out. Have appliances checked by a professional before using them again. Also have the electrical system checked by an electrician before turning the power back on.

13. Check the water and sewage systems. If pipes are damaged, turn off the main water valve.

14. Clean up spilled medicines, bleaches and gasoline. Open cabinets carefully. Be aware of objects that may fall.

15. Try to protect your home from further damage. Open windows and doors to get air moving through.

16. Clean and disinfect everything that got wet. Mud left behind by floodwaters can contain sewage and chemicals.

17. If your basement has flooded, pump it out gradually (about one third of the water per day) to avoid damage. The walls may collapse and the floor may buckle if the basement is pumped out while the surrounding ground is still waterlogged.

18. Check with local authorities before using any water; it could be contaminated. Wells should be pumped out and the water tested by authorities before drinking.

19. Throw out fresh food, cosmetics, and medicines that have come into contact with floodwaters.

Seek help from professional counselors who deal with post-disaster stress.

20. Check refrigerated food for spoilage—your power supply may have been disrupted during the emergency. Throw out all spoiled food and any food that you suspect might be spoiled.

21. Call your insurance agent. Take pictures of damages. Keep good records of repair and cleaning costs.

Getting disaster assistance

Throughout the recovery period, it's important to monitor local radio or television reports and other media sources for information about where to get emergency housing, food, first aid, clothing and financial assistance. Following is general information about the kinds of assistance that may be available.

Direct assistance to individuals and families may come from any number of organizations. The American Red Cross is often stationed right at the scene to help people with their most immediate medical, food and housing needs. Other voluntary organizations, such as the Salvation Army, may also provide food, shelter and supplies, and assist in cleanup efforts.

Church groups and synagogues are often involved as well.

In addition, social service agencies from local or state governments may be available to help people in shelters or provide direct assistance to families.

In the most severe disasters, the federal government is also called in to help individuals and families with temporary housing, counseling (for post-disaster trauma), low-interest loans and grants, and other assistance. Small businesses and farmers are also eligible.

Most federal assistance becomes available when the President of the U.S. declares a "Major Disaster" for the affected area at the request of a state governor. When this happens, FEMA may establish a Disaster Recovery Center (DRC). A DRC is a facility established in, or near to, the community affected by the disaster, where persons can meet face-to-face with represented federal, state and local governments, and volunteer agencies to:

- Discuss their disaster-related needs.
- Obtain information about disaster assistance programs.
- Teleregister for assistance or update registration information.
- Learn about measures for rebuilding that can eliminate or reduce the risk of future loss.
- Learn how to complete the Small Business Administration (SBA) loan application, which is also the form used to qualify all individuals for low cost loans or grants, including those for repair or replacement of damaged homes and furnishings.
- Request the status of their Disaster Housing Application.

Persons can apply for assistance by telephone without going to a DRC by dialing 1-800-621-FEMA (3362).

Mental Health and Crisis Counseling

The emotional toll that disaster brings can sometimes be even more devastating than the financial strains of damage and loss of home, business or personal property.

Children and the elderly are of special concern in the aftermath of disasters. Even individuals who experience a disaster "second hand" through exposure to extensive media coverage can be affected.

Crisis counseling programs often include community outreach, consultation, and education. FEMA and the state and local governments of the affected area may provide crisis counseling assistance to help people cope with and recover from disaster. If you feel you need assistance—get help.

Coping with disaster

You need to be aware of signs that indicate someone may need help in coping with the stress of a disaster.

1. Things to consider when trying to understand disaster events.
   - Everyone who sees or experiences a disaster is affected by it in some way.
   - It is normal to feel anxious about your own safety and that of your family and close friends.
   - Profound sadness, grief and anger are normal reactions to an abnormal event.
   - Acknowledging your feelings helps you recover.
   - Focusing on your strengths and abilities will help you to heal.
   - Accepting help from community programs and resources is healthy.

- We each have different needs and different ways of coping.
- It is common to want to strike back at people who have caused great pain. However, nothing good is accomplished by hateful language or actions.

2. Signs that adults need crisis counseling/stress management assistance.
   - Difficulty communicating thoughts.
   - Difficulty sleeping.
   - Difficulty maintaining balance in their life.
   - Easily frustrated.
   - Increased use of drugs/alcohol.
   - Limited attention span.
   - Poor work performance.
   - Headaches/stomach problems.
   - Tunnel vision/muffled hearing.
   - Colds or flu-like symptoms.
   - Disorientation or confusion.
   - Difficulty concentrating.
   - Reluctance to leave home.
   - Depression, sadness.
   - Feelings of hopelessness.
   - Mood-swings and crying easily.
   - Overwhelming guilt and self-doubt.
   - Fear of crowds, strangers, or being alone.

3. Ways to ease disaster related stress.
   - Talk with someone about your feelings—anger, sorrow, and other emotions—even though it may be difficult.
   - Seek help from professional counselors who deal with post-disaster stress.
   - Don't hold yourself responsible for the disastrous event or be frustrated because you feel that you cannot help directly in the rescue work.
   - Take steps to promote your own physical and emotional healing by staying active in your daily life patterns or by adjusting them. This healthy outlook will help you and your household (e.g., healthy eating, rest, exercise, relaxation, meditation).
   - Maintain a normal household and daily routine, limiting demanding responsibilities of you and your household.
   - Spend time with family and friends.
   - Participate in memorials.
   - Use existing support groups of family, friends, and church.
   - Establish a family disaster plan. Feeling there is something you can do can be very comforting.

Do not drop off food, clothing or any other item to a government agency or disaster relief organization unless a particular item has been requested.

Helping children cope with disaster

Disasters can leave children feeling frightened, confused and insecure. Whether a child has personally experienced trauma, has merely seen the event on television or heard it discussed by adults, it is important for parents and teachers to be informed and ready to help if reactions to stress begin to occur.

Children respond to trauma in many different ways. Some may have reactions very soon after the event; others may seem to be doing fine for weeks or months and then begin to show worrisome behavior. Knowing the signs that are common

at different ages can help parents and teachers recognize problems and respond appropriately.

Reassurance is the key to helping children through a traumatic time. Very young children need a lot of cuddling, as well as verbal support. Answer questions about the disaster honestly, but don't dwell on frightening details or allow the subject to dominate family or classroom time indefinitely. Encourage children of all ages to express emotions through conversation, drawing or painting and to find a way to help others who were affected by the disaster. Also, limit the amount of disaster related material (television, etc.) your children are seeing or hearing and pay careful attention to how graphic it is.

Try to maintain a normal household or classroom routine and encourage children to participate in recreational activity. Reduce your expectations temporarily about performance in school or at home, perhaps by substituting less demanding responsibilities for normal chores.

Additional information about how to communicate with children can be found on the FEMA for Kids website at **www.fema.gov/kids**.

Helping others

The compassion and generosity of the American people is never more evident than after a disaster. People want to help. Here are some general guidelines on helping others after a disaster.

1. In addition to the people you care for on a day-to-day basis, consider the needs of your neighbors and people with special needs.
2. If you want to volunteer, check with local organizations or listen to local news reports for information about where volunteers are needed. Until volunteers are specifically requested, stay away from disaster areas.
3. If you are needed in a disaster area, bring your own food, water and emergency supplies. This is especially important in cases where a large area has been affected and emergency items are in short supply.
4. Do not drop off food, clothing or any other item to a government agency or disaster relief organization unless a particular item has been requested. Normally these organizations do not have the resources to sort through the donated items.
5. You can give a check or money order to a recognized disaster relief organization. These groups are organized to process checks, purchase what is needed and get it to the people who need it most.
6. If your company or organization wants to donate emergency supplies, donate a quantity of a given item or class of items (such as nonperishable food) rather than a mix of different items. Also, determine where your donation is going, how it's going to get there, who's going to unload it and how it's going to be distributed. Without sufficient planning, much needed supplies will be left unused.

Natural Hazards

FLOODS

HURRICANES

THUNDERSTORMS

LIGHTNING

TORNADOES

WINTER STORMS

EXTREME HEAT

EMERGENCY WATER SHORTAGES

EARTHQUAKES

VOLCANOES

LANDSLIDES/DEBRIS FLOWS

TSUNAMIS

FIRE

WILDLAND FIRES

Floods

Floods are one of the most common hazards in the U.S. However, all floods are not alike. Some floods develop slowly, sometimes over a period of days; however, flash floods can dvelop quickly, sometimes in just a few minutes, and without any visible signs of rain. Flash floods often have a dangerous wall of roaring water that carries a deadly cargo of rocks, mud and other debris and can sweep away most things in its path. Overland flooding occurs outside a defined river or stream, such as when a levee is breached, but still can be destructive. Flooding can also occur from a dam breaks, producing effects similar to flash floods.

Go to higher ground during floods. Moving water only 6 inches deep can knock you off your feet.

Flood effects can be very local, impacting a neighborhood or community, or very large, effecting entire river basins and multiple states.

Be aware of flood hazards no matter where you live, but especially if you live in a low-lying area, near water or downstream from a dam. Even very small streams, gullies, creeks, culverts, dry streambeds or low-lying ground that appear harmless in dry weather can flood. Every state is at risk from this hazard.

What to do before a flood

1. Know the terms used to describe flooding:
   - **Flood Watch**—Flooding is possible. Stay tuned to NOAA Weather Radio or commercial radio or television for information. Watches are issued 12 to 36 hours in advance of a possible flooding event.
   - **Flash Flood Watch**—Flash flooding is possible. Be prepared to move to higher ground. A flash flood could occur without any warning. Listen to NOAA Weather Radio or commercial radio or television for additional information.
   - **Flood Warning**—Flooding is occurring or will occur soon. If advised to evacuate, do so immediately.
   - **Flash Flood Warning**—A flash flood is occurring. Seek higher ground on foot immediately.
2. Ask local officials whether your property is in a flood-prone or high-risk area. (Remember that floods often occur outside high-risk areas.) Ask about official flood warning signals and what to do when you hear them. Also ask how you can protect your home from flooding.
3. Identify dams in your area and determine whether they pose a hazard to you.

4. Purchase a NOAA Weather Radio with battery backup and a tone-alert feature that automatically alerts you when a **Watch** or **Warning** is issued (tone alert not available in some areas). Purchase a battery-powered commercial radio and extra batteries.

5. Be prepared to evacuate. Learn your community's flood evacuation routes and where to find high ground. See the "Evacuation" chapter for important information.

6. Talk to your household about flooding. Plan for a place to meet your household in case you are separated from one another and cannot return home. Choose an out-of-town contact for everyone to call to say they are safe. In some emergencies, calling out-of-state is possible even when local phone lines are down.

Keep supplies on hand for an emergency. Remember a battery operated NOAA Weather Radio with a tone-alert feature and extra batteries.

7. Determine how you would care for household members who may live elsewhere but might need your help in a flood. Determine any special needs your neighbors might have.

8. Prepare to survive on your own for at least three days. Assemble a disaster supplies kit. Keep a stock of food and extra drinking water. See the "Emergency Planning and Disaster Supplies" chapter for more information.

9. Know how to shut off electricity, gas and water at main switches and valves. Know where gas pilot lights are located and how the heating system works. Do not actually shut off the gas to see how it works or to show others. Only the gas comapny can safely turn it back on.

10. Consider purchasing flood insurance.

- Flood losses are *not covered* under homeowners' insurance policies.
- FEMA manages the National Flood Insurance Program, which makes federally-backed flood insurance available in communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage.
- Flood insurance is available in most communities through insurance agents.
- There is a 30-day waiting period before flood insurance goes into effect, so don't delay.
- You can buy flood insurance even if your building is outside of the main flood risk zone.

11. Consider options for protecting your property.

- Make a record of your personal property. Take photographs or videotapes of the exterior and interior of your home, including personal belongings. Store these documents in a safe place.
- Keep insurance policies, deeds, property records and other important papers in a safe place, such as a safe deposit box, away from your home.
- Avoid building in a floodplain unless you elevate and reinforce your home.
- Elevate furnace, water heater, and electric panel to higher floors or the attic if they are susceptible to flooding.
- Install "check valves" in sewer traps to prevent flood water from backing up into the drains of your home.
- Construct barriers such as levees, berms, and floodwalls to stop floodwater from entering the building.

- Seal walls in basements with waterproofing compounds to avoid seepage.
- Call your local building department or emergency management office for more information.

What to do during a flood

1. Be aware of flash flooding. If there is *any* possibility of a flash flood, move immediately to higher ground. Do not wait for instructions to move.
2. Listen to radio or television stations for local information.
3. Be aware of streams, drainage channels, canyons and other areas known to flood suddenly. Flash floods can occur in these areas with or without such typical warning signs as rain clouds or heavy rain.
4. If local authorities issue a flood watch, prepare to evacuate:
   - Secure your home. *If you have time*, tie down or bring outdoor equipment and lawn furniture inside. Move essential items to the upper floors.
   - If instructed, turn off utilities at the main switches or valves. Disconnect electrical appliances. *Do not touch* electrical equipment if you are wet or standing in water.
   - Fill the bathtub with water in case water becomes contaminated or services cut off. Before filling the tub, sterilize it with a diluted bleach solution (one part bleach to 10 parts water).
5. Do not walk through moving water. Six inches of moving water can knock you off your feet. If you must walk in a flooded area, walk where the water is not moving. Use a stick or pole to check the firmness of the ground in front of you.

If there is any possibility of a flash flood, move immediately to higher ground. Do not wait for instructions to move.

6. Do not drive into flooded areas. Six inches of water will reach the bottom of most passenger cars causing loss of control and possible stalling. A foot of water will float many vehicles. Two feet of water can carry away most vehicles, including sport utility vehicles (SUV's) and pickups.
7. If floodwaters rise around your car, abandon the car and move to higher ground, if you can do so safely. You and your vehicle can be quickly swept away as floodwaters rise.
8. See the "Evacuation" chapter for important information.

What to do after a flood

1. Avoid floodwaters. The water may be contaminated by oil, gasoline or raw sewage. The water may also be electrically charged from underground or downed power lines.
2. Avoid moving water. Moving water only six inches deep can sweep you off your feet.
3. Be aware of areas where floodwaters have receded. Roads may have weakened and could collapse under the weight of a car.
4. Stay away from downed power lines and report them to the power company.
5. Stay away from designated disaster areas unless authorities ask for volunteers.
6. Return home only when authorities indicate it is safe. Stay out of buildings if surrounded by floodwaters. Use extreme caution when entering buildings. There may be hidden damage, particularly in foundations.
7. Consider your family's health and safety needs:
   - Wash hands with soap and clean water if you come in contact with floodwaters.
   - Throw away food that has come in contact with floodwaters.
   - Listen for news reports to learn whether the community's water supply is safe to drink.
   - Listen to news reports for information about where to get assistance for housing, clothing and food.
   - Seek necessary medical care at the nearest open medical facility.
8. Service damaged septic tanks, cesspools, pits, and leaching systems as soon as possible. Damaged sewage systems are serious health hazards.

There is a 30-day waiting period before flood insurance goes into effect, so don't delay.

9. Contact your insurance agent. If your policy covers your claim, an adjuster will be assigned to visit your home. To prepare:
   - Take photos or videotapes of your damaged property.
   - Separate damaged and undamaged belongings.
   - Locate your financial records.
   - Keep detailed records of cleanup costs.
10. If your residence has been flooded, obtain a copy of *Repairing Your Flooded Home* from the American Red Cross. To mitigate future flood damage, obtain FEMA's *Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding.* See the "For More Information" chapter for how to order this and other publications.
11. See the "Recovering From Disaster" chapter for more information.

Hurricanes

A hurricane is a type of tropical cyclone, the generic term for a low pressure system that generally forms in the tropics. The ingredients for a hurricane include a pre-existing weather disturbance, warm tropical oceans, moisture, and relatively light winds aloft. A typical cyclone is accompanied by thunderstorms, and in the Northern Hemisphere, a counterclockwise circulation of winds near the earth's surface.

All Atlantic and Gulf of Mexico coastal areas are subject to hurricanes or tropical storms. Although rarely struck by hurricanes, parts of the Southwest United States and the Pacific Coast experience heavy rains and floods each year from hurricanes spawned off Mexico. The Atlantic hurricane season lasts from June to November with the peak season from mid-August to late October.

Hurricanes can cause catastrophic damage to coastlines and several hundred miles inland. Winds can exceed 155 miles-per-hour. Hurricanes and tropical storms can also spawn tornadoes and microbursts, create surge along the coast, and cause extensive damage due to inland flooding from trapped water.

Tornadoes most often occur in thunderstorms embedded in rain bands well away from the center of the hurricane; however, they also occur near the eye-wall. Typically, tornadoes produced by tropical cyclones are relatively weak and short-lived but still pose a threat.

A storm surge is a huge dome of water pushed on-shore by hurricane and tropical storm winds. Storm surges can reach 25 feet high and be 50-100 miles wide. Storm tide is a combination of the storm surge and the normal tide (i.e., a 15 foot storm surge combined with a 2 foot normal high tide over the mean sea level creates a 17 foot storm tide). These phenomena cause severe erosion and extensive damage to coastal areas.

Despite improved warnings and a decrease in the loss of life, property damage continues to rise because an increasing number of people are living or vacationing near coastlines. Those in hurricane-prone areas need to be prepared for hurricanes and tropical storms.

Hurricanes are classified into five categories based on their wind speed, central pressure and damage potential (see chart on p.34). Category Three and higher are considered major hurricanes, though Category One and Two are still extremely dangerous and warrant your full attention.

Inland/freshwater flooding from hurricanes

Hurricanes can produce widespread torrential rains. Floods are the deadly and destructive result. Excessive rain can also trigger landslides or mud slides, especially in mountainous regions. Flash flooding can occur due to the intense rainfall. Flooding on rivers and streams may persist for several days or more after the storm.

The speed of the storm and the geography beneath the storm are the primary factors regarding the amount of rain produced. Slow moving storms and tropical storms moving into mountainous regions tend to produce more rain.

Between 1970 and 1999, more people lost their lives from freshwater flooding associated with landfalling tropical cyclones than from any other weather hazard related to tropical cyclones.

See the "Floods" chapter for more specific information on flood related emergencies.

What to do before a hurricane

1. Learn the terns used by weather forecasters:

   Tropical Depression. An organized system of clouds and thunderstorms with a defined surface circulation and maximum sustained winds of 38 mph (33 knots) or less. Sustained winds are defined as one-minute average wind measured at about 33 ft (10 meters) above the surface.

   Tropical Storm. An organized system of strong thunderstorms with a defined surface circulation and maximum sustained winds of 39-73 mph (34-63 knots).

   Hurricane. An intense tropical weather system of strong thunderstorms with a well-defined surface circulation and maximum sustained winds of 74 mph (64 knots) or higher.

   Storm Surge. A dome of water pushed on shore by hurricane and tropical storm winds.

   Storm Tide. A combination of storm surge and the normal tide (e.g., a 15-foot storm surge combined with a 2-foot normal tide over the mean sea level creates a 17-foot storm tide.)

2. Know the difference between "Watches" and "Warnings."
   - **Hurricane/Tropical Storm Watch—** Hurricane/tropical storm conditions are possible in the specified area, usually within 36 hours.

Saffir-Simpson Hurricane Scale

Scale Number (Category)	Sustained Winds (MPH)	Damage	Storm Surge
1	74-95	**Minimal:** Unanchored mobile homes, vegetation and signs.	4-5 feet
2	96-110	**Moderate:** All mobile homes, roofs, small crafts, flooding.	6-8 feet
3	111-130	**Extensive:** Small buildings, low-lying roads cut off.	9-12 feet
4	131-155	**Extreme:** Roofs destroyed, trees down, roads cut off, mobile homes destroyed. Beach homes flooded.	13-18 feet
5	>155	**Catastrophic:** Most buildings destroyed. Vegetation destroyed. Major roads cut off. Homes flooded.	>18 feet

- **Hurricane/Tropical Storm Warning**—Hurricane/tropical storm conditions are expected in the specified area, usually within 24 hours.
- **Short Term Watches and Warnings**—These warnings provide detailed information on specific hurricane threats, such as flash floods and tornadoes.

3. Listen for local radio or television weather forecasts. Purchase a NOAA Weather Radio with battery backup and a tone-alert feature that automatically alerts you when a Watch or Warning is issued (tone alert is not available in some areas). Purchase a battery-powered commercial radio and extra batteries as well because information on other events will be broadcast by the media.

4. Ask your local emergency management office about community evacuation plans relating to your neighborhood. Learn evacuation routes. Determine where you would go and how you would get there if you needed to evacuate. Sometimes alternate routes are desirable.

5. Talk to your household about hurricane issues. Create a household disaster plan. Plan to meet at a place away from your residence in case you are separated. Choose an out-of-town contact for everyone to call to say they are safe.

6. Determine the needs of your household members who may live elsewhere but need your help in a hurricane. Consider the special needs of neighbors, such as people that are disabled or those with limited sight or vision problems.

7. Prepare to survive on your own for at least three days. Assemble a disaster supplies kit. Keep a stock of food and extra drinking water. See the "Emergency Planning and Disaster Supplies" and "Evacuation" chapters for more information.

8. Make plans to secure your property. Permanent storm shutters offer the best protection for windows. A second option is to board up windows with 5/8" marine plywood, cut to fit and ready to install. Tape does not prevent windows from breaking.

Create a household disaster plan. Plan to meet your family in case you are separated. Choose an out-of-town contact for everyone to call to say they are safe.

9. Learn how to shut off utilities and where gas and water shutoffs are located. Do not actually shut off the gas to see how it works or to show others. Only the gas comapny can safely turn it back on.

10. Have your home inspected for compliance with local building codes. Many of the roofs destroyed by hurricanes were not constructed or retrofitted according to building codes. Installing straps or additional clips to securely fasten your roof to the frame structure will substantially reduce roof damage.

11. Be sure trees and shrubs around your home are well trimmed. Dead limbs or trees could cause personal injury or property damage. Clear loose and clogged rain gutters and downspouts.

12. If you have a boat, determine where to secure it in an emergency.

13. Consider flood insurance. Purchase insurance well in advance—there is a 30-day waiting period before flood insurance takes effect.

14. Make a record of your personal property. Take photographs or videotapes of the exterior and interior of your home,

including personal belongings. Store these documents in a safe place, such as a safe deposit box.

What to do during a hurricane threat

1. Listen to radio or television newscasts. If a hurricane "Watch" is issued, you typically have 24 to 36 hours before the hurricane hits land.
2. Talk with household members. Make sure everyone knows where to meet and who to call, in case you are separated. Consider the needs of relatives and neighbors with special needs.
3. Secure your home. Close storm shutters. Secure outdoor objects or bring them indoors. Moor your boat if time permits.
4. Gather several days' supply of water and food for each household member. Water systems may become contaminated or damaged. After sterilizing the bathtub and other containers with a diluted bleach solution of one part bleach to ten parts water, fill them with water to ensure a safe supply in case you are unable or told not to evacuate. Refer to the "Shelter and Emergency Planning" and "Disaster Supplies" chapters for important information.
5. If you are evacuating, take your disaster supplies kit with you to the shelter. Remember that alcoholic beverages and weapons are prohibited within shelters. Also, pets are not allowed in a public shelter due to health reasons. See the "Animals in Disaster" chapter and contact your local humane society for additional information.

Alcoholic beverages and weapons are prohibited within shelters. Also, pets are not allowed in public shelters for health reasons.

6. Prepare to evacuate. Fuel your car—service stations may be closed after the storm. If you do not have a car, make arrangements for transportation with a friend or relative. Review evacuation routes. If instructed, turn off utilities at the main valves or switches.
7. Evacuate to an inland location, if:
   - Local authorities announce an evacuation and you live in an evacuation zone.
   - You live in a mobile home or temporary structure—they are particularly hazardous during hurricanes no matter how well fastened to the ground.
   - You live in a high-rise. Hurricane winds are stronger at higher elevations.
   - You live on the coast, on a floodplain near a river or inland waterway.
   - You feel you are in danger.
8. When authorities order an evacuation:
   - Leave immediately.
   - Follow evacuation routes announced by local officials.
   - Stay away from coastal areas, riverbanks and streams.
   - Tell others where you are going.
9. If you are not required or are unable to evacuate, stay indoors during the hurricane and away from windows and glass doors. Keep curtains and blinds closed. Do not be fooled if there is a lull, it could be the eye of the storm—winds will pick up again.
   - If not instructed to turn off, turn the refrigerator to its coldest setting and keep closed.
   - Turn off propane tanks.

10. In strong winds, follow these rules:
    - Take refuge in a small interior room, closet or hallway.
    - Close all interior doors. Secure and brace external doors.
    - In a two-story residence, go to an interior first-floor room, such as a bathroom or closet.
    - In a multiple-story building, go to the first or second floors and stay in interior rooms away from windows.
    - Lie on the floor under a table or another sturdy object.
11. Avoid using the phone except for serious emergencies. Local authorities need first priority on telephone lines.
12. See the "Evacuation" chapter for important information.

Consider your household's health and safety needs and be aware of symptoms of stress and fatigue. Seek crisis counseling if you have need.

What to do after a hurricane

1. Stay where you are if you are in a safe location until local authorities say it is safe to leave. If you evacuated the community, do not return to the area until authorities say it is safe to return.
2. Keep tuned to local radio or television stations for information about caring for your household, where to find medical help, how to apply for financial assistance, etc.
3. Drive only when necessary. Streets will be filled with debris. Roads will have weakened and could collapse. Do not drive on flooded or barricaded roads or bridges. Roads are closed for your protection. As little as six inches of water may cause you to lose control of your vehicle—two feet of water will carry most cars away.
4. Do not drink or prepare food with tap water until notified by officials that it is safe to do so.
5. Consider your family's health and safety needs. Be aware of symptoms of stress and fatigue. Keep your household together and seek crisis counseling if you have need. See the "Mental Health and Crisis Counseling" section of the "Recovering from Disaster" chapter for more information.
6. Talk with your children about what has happened and how they can help during the recovery. Being involved will help them deal with the situation. Consider the needs of your neighbors. People often become isolated during hurricanes.
7. Stay away from disaster areas unless local authorities request volunteers. If you are needed, bring your own drinking water, food and sleeping gear.
8. Stay away from riverbanks and streams until potential flooding has passed. Do not allow children to play in flooded areas. There is a high risk of injury or drowning in areas that may appear safe.
9. Stay away from moving water. Moving water only six inches deep can sweep you off your feet. Standing water may be electrically charged from underground or downed power lines.
10. Stay away from downed power lines and report them to the power company. Report broken gas, sewer or water mains to local officials.

11. Don't use candles or other open flames indoors. Use a flashlight to inspect damage.
12. Set up a manageable schedule to repair property.
13. Contact your insurance agent. An adjuster will be assigned to visit your home. To prepare:
    - Take photos or videotapes of your damaged property.
    - Separate damaged and undamaged belongings.
    - Locate your financial records.
    - Keep detailed records of cleanup costs.
14. Consider building a "Safe Room or Shelter" to protect your household. See the "Thunderstorms" chapter for additional information in the "Tornadoes" section.
15. See the "Recovering From Disaster" chapter for more important information.

Thunderstorms

Thunderstorms are very common and affect great numbers of people each year. Despite their small size in comparison to hurricanes and winter storms, all thunderstorms are dangerous. Every thunderstorm produces lightning. Other associated dangers of thunderstorms include tornadoes, strong winds, hail, and flash flooding. Flash flooding is responsible for more fatalities— more than 140 annually— than any other thunderstorm-associated hazard.

When thunderstorms threaten your area, get inside a home, building or hard top automobile and stay away from metallic objects and fixtures.

Some thunderstorms do not produce rain that reaches the ground. These are generically referred to as dry thunderstorms and are most prevalent in the western United States. Known to spawn wildfires, these storms occur when there is a large layer of dry air between the base of the cloud and the ground. The falling raindrops evaporate, but lightning can still reach the ground.

What to do before thunderstorms approach

1. Know the terms used by weather forecasters:
   - **Severe Thunderstorm Watch**— Tells you when and where severe thunderstorms are likely to occur. Watch the sky and stay tuned to radio or television to know when warnings are issued.
   - **Severe Thunderstorm Warning**— Issued when severe weather has been reported by spotters or indicated by radar. Warnings indicate imminent danger to life and property to those in the path of the storm.
2. Know thunderstorm facts:
   - 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.
   - Thunderstorms typically produce heavy rain for a brief period, anywhere from 30 minutes to an hour.
   - Warm, humid conditions are very favorable for thunderstorm development.
   - A typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes.
   - Of the estimated 100,000 thunderstorms each year in the United States, about 10 percent are classified as severe.
   - A thunderstorm is classified as 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.

3. Know the calculation to determine how close you are to a thunderstorm:
   - Count the number of seconds between a flash of lightning and the next clap of thunder. Divide this number by 5 to determine the distance to the lightning in miles.
4. Remove dead or rotting trees and branches that could fall and cause injury or damage during a severe thunderstorm.
5. When a thunderstorm approaches, secure outdoor objects that could blow away or cause damage. Shutter windows, if possible, and secure outside doors. If shutters are not available, close window blinds, shades, or curtains.

If a Tornado Warning is issued, take shelter immediately.

Lightning

The ingredient that defines a thunderstorm is lightning. Since lightning creates thunder, a storm producing lightning is called a thunderstorm.

Lightning occurs during all thunderstorms. Lightning results from the buildup and discharge of electrical energy between positively and negatively charged areas.

The unpredictability of lightning increases the risk to individuals and property. In the United States, an average of 300 people are injured and 80 people are killed each year by lightning. Although most lightning victims survive, people 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 a long period of time.

When thunderstorms threaten your area, get inside a home, building or hard top automobile (not a convertible) and stay away from metallic objects and fixtures.

1. If you are **inside** a home:
   - Avoid showering or bathing. Plumbing and bathroom fixtures can conduct electricity.
   - Avoid using a corded telephone, except for emergencies. Cordless and cellular telephones are safe to use.
   - Unplug appliances and other electrical items such as computers and turn off air conditioners. Power surges from lightning can cause serious damage.
   - Use your battery operated NOAA Weather Radio for updates from local officials.
2. If **outside**, with no time to reach a safe location, follow these recommenations:
   - In a **forest**, seek shelter in a low area under a thick growth of small trees.
   - In **open areas**, go to a low place such as a ravine or valley. Be alert for flash floods.
   - Do not stand under a natural lightning rod, such as a tall, isolated tree in an open area.
   - Do not stand on a hilltop, in an open field, on the beach or in a boat on the water.
   - Avoid isolated sheds or other small structures in open areas.

- Get away from open water. If you are boating or swimming, get to land and find shelter immediately.
- Get away from anything metal—tractors, farm equipment, motorcycles, golf carts, golf clubs and bicycles.
- Stay away from wire fences, clotheslines, metal pipes, rails and other metallic paths that could carry lightning to you from some distance away.
- If you feel your hair stand on end (which indicates that lightning is about to strike), squat low to the ground on the balls of your feet. Place your hands over your ears and your head between your knees. Make yourself the smallest target possible and minimize your contact with the ground. DO NOT lie flat on the ground.

3. Remember the following facts and safety tips about lightning.

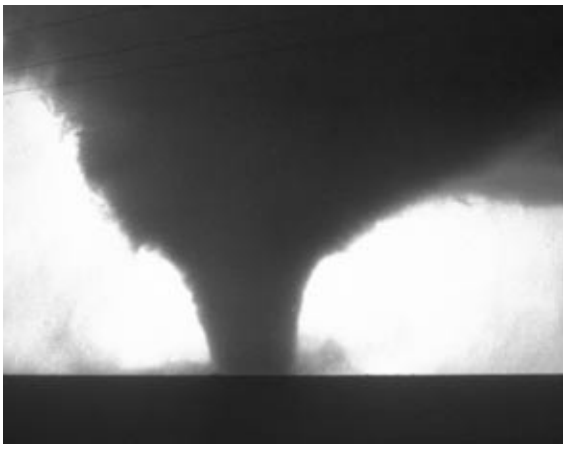
Facts:

- Lightning often strikes outside of heavy rain and may occur as far as 10 miles away from any rainfall.
- Lightning-strike victims carry no electrical charge and should be attended to immediately. If breathing has stopped, begin mouth-to-mouth resuscitation. If the heart has stopped, a trained person should administer CPR. If the victim has a pulse and is breathing, look for other possible injuries. Check for burns where the lightning entered and left the body. Be alert also for nervous system damage, broken bones, and loss of hearing or eyesight. Contact your local emergency management office or American Red Cross chapter for information on CPR and first aid classes.
- "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!
- Most lightning deaths and injuries occur when people are caught outdoors in the summer months during the afternoon and evening.
- Many fires in the western United States and Alaska are started by lightning.
- Lightning can occur from cloud-to-cloud, within a cloud, cloud-to-ground, or cloud-to-air.
- Your chances of being struck by lightning are estimated to be 1 in 600,000 but could be even less by following safety tips.

Safety Tips:

- Postpone outdoor activities if thunderstorms are likely.
- Remember the 30/30 lightning safety rule – Go indoors if, after seeing lighting, you cannot count to 30 before hearing thunder. Stay indoors for 30 minutes after hearing the last clap of thunder.
- 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.

Tornadoes



Tornadoes are nature's most violent storms. Spawned from powerful thunderstorms, tornadoes can uproot trees, destroy buildings and turn harmless objects into deadly missiles. They can devastate a neighborhood in seconds.

A tornado appears as a rotating, funnel-shaped cloud that extends to the ground with whirling winds that can reach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long. Every state is at some risk from this hazard.

Tornado facts

1. A tornado is a violently rotating column of air extending from a thunderstorm to the ground.
2. Tornadoes are capable of destroying homes and vehicles and can cause fatalities.
3. Tornadoes may strike quickly, with little or no warning.
4. Tornadoes may appear nearly transparent until dust and debris are picked up or a cloud forms in the funnel. The average tornado moves SW to NE but tornadoes have been known to move in any direction.
5. The average forward speed is 30 mph but may vary from stationary to 70 mph with rotating winds that can reach 300 miles per hour.
6. Tornadoes can accompany tropical storms and hurricanes as they move onto land.
7. Waterspouts are tornadoes that form over water.
8. Tornadoes are most frequently reported east of the Rocky Mountains during spring and summer months but can occur in any state at any time of year.
9. In the southern states, peak tornado season is March through May, while peak months in the northern states are during the late spring and early summer.
10. Tornadoes are most likely to occur between 3 p.m. and 9 p.m., but can occur at any time of the day or night.

What to do before tornadoes threaten

1. Know the terms used to describe tornado threats:
   - **Tornado Watch**— Tornadoes are possible. Remain alert for approaching storms. Watch the sky and stay tuned to radio or television to know when warnings are issued.
   - **Tornado Warning** — A tornado has been sighted or indicated by weather radar. Take shelter immediately.
2. Ask your local emergency management office or American Red Cross chapter about the tornado threat in your area. Ask about community

warning signals.

3. Purchase a NOAA Weather Radio with a battery backup and tone-alert feature that automatically alerts you when a Watch or Warning is issued (tone alert not available in some areas). Purchase a battery-powered commercial radio and extra batteries as well.

4. Know the county or parish in which you live. Counties and parishes are used in Watches and Warnings to identify the location of tornadoes.

5. Determine places to seek shelter, such as a basement or storm cellar. If an underground shelter is not available, identify an interior room or hallway on the lowest floor.

6. Practice going to your shelter with your household.

7. Know the locations of designated shelters in places where you and your household spend time, such as public buildings, nursing homes and shopping centers. Ask local officials whether a registered engineer or architect has inspected your children's schools for shelter space.

8. Ask your local emergency manager or American Red Cross chapter if there are any public safe rooms or shelters nearby. See the "Safe Room and Shelter" section at the end of this chapter for more information.

9. Assemble a disaster supplies kit. Keep a stock of food and extra drinking water. See the "Emergency Planning and Disaster Supplies" and "Evacuation" chapters for more information.

10. Make a record of your personal property. Take photographs or videotapes of the exterior and interior of your home, including personal belongings. Store these documents in a safe place, such as a safe deposit box.

With your household, determine where you would take shelter in case a Tornado Warning was issued. Storm cellars or basements provide the best protection. If underground shelter is not available seek shelter in an interior room or hallway on the lowest floor.

What to do during a tornado watch

1. Listen to NOAA Weather Radio or to commercial radio or television newscasts for the latest information.

2. Be alert for approaching storms. If you see any revolving funnel shaped clouds, report them immediately by telephone to your local police department or sheriff's office.

3. Watch for tornado danger signs:

- Dark, often greenish sky
- Large hail
- A large, dark, low-lying cloud (particularly if rotating)
- Loud roar, similar to a freight train

Caution:

- Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others.
- Occasionally, tornadoes develop so rapidly that little, if any, advance warning is possible.
- Before a tornado hits, the wind may die down and the air may become very still.
- A cloud of debris can mark the location of a tornado even if a funnel is not visible.
- Tornadoes generally occur near the trailing edge of a thunderstorm. It is

not uncommon to see clear, sunlit skies behind a tornado.

4. Avoid places with wide-span roofs such as auditoriums, cafeterias, large hallways, supermarkets or shopping malls.

5. Be prepared to take shelter immediately. Gather household members and pets. Assemble supplies to take to the shelter such as flashlight, battery-powered radio, water, and first aid kit.

What to do during a tornado warning

When a tornado has been sighted, go to your shelter immediately.

1. In a residence or small building, move to a pre-designated shelter, such as a basement, storm cellar or "Safe Room or Shelter."
2. If there is no basement, go to an interior room on the lower level (closets, interior hallways). Put as many walls as possible between you and the outside. Get under a sturdy table and use arms to protect head and neck. Stay there until the danger has passed.
3. Do not open windows. Use the time to seek shelter.
4. Stay away from windows, doors and outside walls. Go to the center of the room. Stay away from corners because they attract debris.
5. In a school, nursing home, hospital, factory or shopping center, go to predetermined shelter areas. Interior hallways on the lowest floor are usually safest. Stay away from windows and open spaces.
6. In a high-rise building, go to a small, interior room or hallway on the lowest floor possible.
7. Get out of vehicles, trailers and mobile homes immediately and go to the lowest floor of a sturdy nearby building or a storm shelter. Mobile homes, even if tied down, offer little protection from tornadoes.

If caught outside with no shelter when a tornado hits, lie flat in a nearby ditch or depression and cover your head with your hands. Be aware of potential for flooding.

8. If caught outside with no shelter, lie flat in a nearby ditch or depression and cover your head with your hands. Be aware of potential for flooding.

9. Do not get under an overpass or bridge. You are safer in a low, flat location.

10. Never try to outrun a tornado in urban or congested areas in a car or truck; instead, leave the vehicle immediately for safe shelter. Tornadoes are erratic and move swiftly.

11. Watch out for flying debris. Flying debris from tornadoes causes most fatalities and injuries.

What to do after a tornado

1. Look out for broken glass and downed power lines.
2. Check for injuries. Do not attempt to move seriously injured persons unless they are in immediate danger of death or further injury. If you must move an unconscious person, first stabilize the neck and back, then call for help immediately.
   - If the victim is not breathing, carefully position the victim for artificial respiration, clear the airway and commence mouth-to-mouth resuscitation.

- Maintain body temperature with blankets. Be sure the victim does not become overheated.
- Never try to feed liquids to an unconscious person.

3. Use caution when entering a damaged building. Be sure that walls, ceiling and roof are in place and that the structure rests firmly on the foundation. Wear sturdy work boots and gloves.

4. See the "Recovering From Disaster" chapter for more important information.

Wind "Safe Room and Shelter"

Extreme windstorms in many parts of the country pose a serious threat to buildings and their occupants.

Your residence may be built "to code," but that does not mean that it can withstand winds from extreme events like tornadoes or major hurricanes.

The purpose of a wind shelter or "Safe Room" is to provide a space where you and your household can seek refuge that provides a high level of protection. You can build a shelter in one of the several places in your home:

- In your basement
- Beneath a concrete slab-on-grade foundation or garage floor
- In an interior room on the first floor

Shelters built below ground level provide the greatest protection, but a shelter built in a first-floor interior room can also provide the necessary protection. Below-ground shelters must be designed to avoid accumulating water during the heavy rains that often accompany severe windstorms.

To protect its occupants, an in-house shelter must be built to withstand high winds and flying debris, even if the rest of the residence is severely damaged or destroyed. Therefore:

- The shelter must be adequately anchored to resist overturning and uplift.
- The walls, ceiling, and door of the shelter must withstand wind pressure and resist penetration by windborne objects and falling debris.
- The connections between all parts of the shelter must be strong enough to resist the wind.
- If sections of either interior or exterior residence walls are used as walls of the shelter, they must be separated from the structure of the residence, so that damage to the residence will not cause damage to the shelter.

If you are concerned about wind hazards where you live, especially if you live in high-risk areas, you should consider building a shelter. Publications are available from FEMA to assist in determining if you need a shelter and how to construct a shelter. Contact the FEMA distribution center for a copy of *Taking Shelter from the Storm* (L-233 for the brochure and FEMA-320 for the booklet with complete construction plans).

Winter Storms and Extreme Cold

Heavy snowfall and extreme cold can immobilize an entire region. Even areas that normally experience mild winters can be hit with a major snowstorm or extreme cold. The impacts include flooding, storm surge, closed highways, blocked roads, downed power lines and hypothermia.

You can protect yourself and your household from the many hazards of winter by planning ahead.

What to do before a winter storm threatens

1. Know the terms used by weather forecasters:
   - **Freezing rain**—Rain that freezes when it hits the ground, creating a coating of ice on roads, walkways, trees and power lines.
   - **Sleet**—Rain that turns to ice pellets before reaching the ground. Sleet also causes moisture on roads to freeze and become slippery.
   - **Winter Storm Watch**—A winter storm is possible in your area.
   - **Winter Storm Warning**—A winter storm is occurring, or will soon occur in your area.
   - **Blizzard Warning**—Sustained winds or frequent gusts to 35 miles-per-hour or greater and considerable amounts of falling or blowing snow (reducing visibility to less than a quarter mile) are expected to prevail for a period of three hours or longer.
   - **Frost/Freeze Warning**—Below freezing temperatures are expected.
2. Prepare to survive on your own for at least three days. Assemble a disaster supplies kit. Be sure to include winter specific items such as rock salt to melt ice on walkways, sand to improve traction, snow shovels and other snow removal equipment. Keep a stock of food and extra drinking water. See the "Emergency Planning and Disaster Supplies" and "Evacuation" chapters for more information.
3. Prepare for possible isolation in your home:
   - Have sufficient heating fuel; regular fuel sources may be cut off.
   - Have emergency heating equipment and fuel (a gas fireplace or a wood burning stove or fireplace) so you can keep at least one room of your residence at a livable temperature. (Be sure the room is well ventilated.) If a thermostat controls your furnace and your electricity is cut off by a storm, you will need emergency heat.

- Kerosene heaters are another emergency heating option. Never use any fuel other than kerosene in a kerosene heater.
- Store a good supply of dry, seasoned wood for your fireplace or wood-burning stove.
- Keep fire extinguishers on hand, and make sure your household knows how to use them.
- Never burn charcoal indoors.

4. Winterize your home to extend the life of your fuel supply.
   - Insulate walls and attics.
   - Caulk and weather-strip doors and windows.
   - Install storm windows or cover windows with plastic.
5. Maintain several days' supply of medicines, water, and food that needs no cooking or refrigeration.

Be careful when shoveling snow. Overexertion can bring on a heart attack. Stretch before going outside and don't overexert yourself.

What to do during a winter storm

1. Listen to your radio, television, or NOAA Weather Radio for weather reports and emergency information.
2. Eat regularly and drink ample fluids, but avoid caffeine and alcohol.
3. Dress for the season:
   - Wear several layers of loose fitting, lightweight, warm clothing rather than one layer of heavy clothing. The outer garments should be tightly woven and water repellent.
   - Mittens are warmer than gloves.
   - Wear a hat; most body heat is lost through the top of the head.
   - Cover your mouth with a scarf to protect your lungs.
4. Be careful when shoveling snow. Over-exertion can bring on a heart attack—a major cause of death in the winter. If you must shovel snow, stretch before going outside and don't overexert yourself.
5. Watch for signs of frostbite: loss of feeling and white or pale appearance in extremities such as fingers, toes, ear lobes or the tip of the nose. If symptoms are detected, get medical help immediately
6. Watch for signs of hypothermia: uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness and apparent exhaustion. If symptoms of hypothermia are detected, get the victim to a warm location, remove any wet clothing, warm the center of the body first, and give warm, non-alcoholic beverages if the victim is conscious. Get medical help as soon as possible.
7. When at home:
   - Conserve fuel if necessary by keeping your residence cooler than normal. Temporarily "close off" heat to some rooms.
   - When using kerosene heaters, maintain ventilation to avoid build-up of toxic fumes. Refuel kerosene heaters outside and keep them at least three feet from flammable objects.

Winter driving

About 70 percent of winter deaths related to snow and ice occur in automobiles. Consider public transportation if you must

travel. If you travel by car, travel in the day, don't travel alone, and keep others informed of your schedule. Stay on main roads; avoid back-road shortcuts.

1. Winterize your car. This includes a battery check, antifreeze, wipers and windshield washer fluid, ignition system, thermostat, lights, flashing hazard lights, exhaust system, heater, brakes, defroster, oil level, and tires. Consider snow tires, snow tires with studs, or chains. Keep your car's gas tank full.

2. Carry a disaster supplies "winter car kit" in the trunk of your car. The kit should include:
   - Shovel
   - Windshield scraper
   - Battery-powered radio
   - Flashlight
   - Extra batteries
   - Water
   - Snack food
   - Mittens
   - Hat
   - Blanket
   - Tow chain or rope
   - Tire chains
   - Bag of road salt and sand
   - Fluorescent distress flag
   - Jumper/booster cables
   - Road maps
   - Emergency flares
   - Cellular telephone or two-way radio, if available.

3. If a blizzard traps you in your car:
   - Pull off the highway. Turn on hazard lights and hang a distress flag from the radio aerial or window.
   - Remain in your vehicle where rescuers are most likely to find you. Do not set out on foot unless you can see a building close by where you know you can take shelter. Be careful: distances are distorted by blowing snow. A building may seem close but be too far to walk to in deep snow.
   - Run the engine and heater about ten minutes each hour to keep warm. When the engine is running, open a window slightly for ventilation. This will protect you from possible carbon monoxide poisoning. Periodically clear snow from the exhaust pipe.
   - Exercise to maintain body heat, but avoid overexertion. In extreme cold, use road maps, seat covers and floor mats for insulation. Huddle with passengers and use your coat for a blanket.
   - Take turns sleeping. One person should be awake at all times to look for rescue crews.
   - Drink fluids to avoid dehydration.
   - Be careful not to waste battery power. Balance electrical energy needs—the use of lights, heat and radio—with supply.
   - At night, turn on the inside light so work crews or rescuers can see you.
   - If stranded in a remote area, stomp large block letters in an open area spelling out HELP or SOS and line with rocks or tree limbs to attract the attention of rescue personnel who may be surveying the area by airplane.
   - Once the blizzard passes, you may need to leave the car and proceed on foot.

About 70% of winter deaths related to snow and ice occur in automobiles. Travel by car in daylight, don't travel alone, keep others notified of your schedule and stay on main roads – avoid back-road short cuts.

Extreme Heat (Heat Wave)

Heat kills 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.

Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. The elderly, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

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Conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Consequently, people living in urban areas may be at greater risk from the effects of a prolonged heat wave than those living in rural areas. Also, asphalt and concrete store heat longer and gradually release heat at night, which can produce higher nighttime temperatures known as the "urban heat island effect."

What to do before an extreme heat emergency

1. Know the terms associated with extreme heat:
   - **Heat wave**—Prolonged period of excessive heat, often combined with excessive humidity.
   - **Heat index**—A number in degrees Fahrenheit (F) that tells how hot it feels when relative humidity is added to the air temperature. Exposure to full sunshine can increase the heat index by 15 degrees.
   - **Heat cramps**—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**—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.
   - **Sun stroke**—Another term for heat stroke.
2. Consider the following preparedness measures when faced with the possibility of extreme heat.
   - Install window air conditioners snugly, insulate if necessary.
   - Check air-conditioning ducts for proper insulation.

- Install temporary window reflectors (for use between windows and drapes), such as aluminum foil covered cardboard, to reflect heat back outside and be sure to weather-strip doors and sills to keep cool air in.
- Cover windows that receive morning or afternoon sun with drapes, shades, awnings or louvers. Outdoor awnings or louvers can reduce the heat that enters a home by up to 80 percent. Consider keeping storm windows up all year.

3. See the "Emergency Planning and Disaster Supplies" chapter for more information.

Conserve electricity during periods of extreme heat. People tend to use a lot more power for air conditioning, which could lead to a power shortage or outage.

What to do during extreme heat or a heat wave emergency

1. Stay indoors as much as possible.
   - If air conditioning is not available, stay on the lowest floor out of the sunshine.
   - Circulating air can cool the body by increasing the perspiration rate of evaporation.
2. Eat well-balanced, light and regular meals. Avoid using salt tablets unless directed to do so by a physician.
3. Drink plenty of water regularly even if you do not feel thirsty.
   - Persons who have epilepsy or heart, kidney, or liver disease, are on fluid-restrictive diets, or have a problem with fluid retention should consult a doctor before increasing liquid intake.
4. Limit intake of alcoholic beverages.
   - Although beer and alcoholic beverages appear to satisfy thirst, they actually cause further body dehydration.
5. Never leave children or pets alone in closed vehicles.
6. Dress in loose-fitting clothes that cover as much skin as possible.
   - Lightweight, light-colored clothing reflects heat and sunlight and helps maintain normal body temperature.
7. Protect face and head by wearing a wide-brimmed hat.
8. Avoid too much sunshine.
   - Sunburn slows the skin's ability to cool itself. Use a sunscreen lotion with a high SPF (sun protection factor) rating (i.e., 15 or greater).
9. Avoid strenuous work during the warmest part of the day. Use a buddy system when working in extreme heat and take frequent breaks.
10. Spend at least two hours per day in an air-conditioned place. If your home is not air conditioned, consider spending the warmest part of the day in public buildings such as libraries, schools, movie theaters, shopping malls and other community facilities.
11. Check on family, friends, and neighbors who do not have air conditioning and who spend much of their time alone.

First-aid for heat-induced illnesses

1. **Sunburn**
   - *Symptoms:* Skin redness and pain, possible swelling, blisters, fever, headaches.
   - *First Aid:* Take a shower, using soap, to remove oils that may block pores, preventing the body from cooling naturally. If blisters occur, apply dry, sterile dressings and get medical attention.
2. **Heat cramps**
   - *Symptoms:* Painful spasms, usually in leg and abdominal muscles. Heavy sweating.
   - *First Aid:* Get the victim out to a cooler location. Lightly stretch and gently massage affected muscles to relieve spasm. Give sips of up to a half glass of cool water every 15 minutes. Do not give liquids with caffeine or alcohol. If nauseous, discontinue liquids.
3. **Heat exhaustion**
   - *Symptoms:* Heavy sweating and skin may be cool, pale or flushed. Weak pulse. Normal body temperature is possible but temperature will likely rise. Fainting or dizziness, nausea or vomiting, exhaustion and headaches are possible.
   - *First Aid:* Get victim to lie down in a cool place. Loosen or remove clothing. Apply cool, wet cloths. Fan or move victim to air-conditioned place. Give sips of water if victim is conscious. Be sure water is consumed slowly. Give half glass of cool water every 15 minutes. If nausea occurs, discontinue. If vomiting occurs, seek immediate medical attention.
4. **Heat stroke (sun stroke)**
   - *Symptoms:* High body temperature (105+). Hot, red, dry skin. Rapid, weak pulse; and rapid, shallow breathing. Possible unconsciousness. Victim will likely not sweat unless victim was sweating from recent strenuous activity.
   - *First Aid:* Heat stroke is a severe medical emergency. Call 911 or emergency medical services or get the victim to a hospital immediately. Delay can be fatal. Move victim to a cooler environment. Remove clothing. Try a cool bath, sponging or wet sheet to reduce body temperature. Watch for breathing problems. Use extreme caution. Use fans and air conditioners.

Emergency Water Shortage

An emergency water shortage can be caused by prolonged drought, poor water supply management or contamination of a surface water supply source or aquifer.

A drought is a period of abnormally dry weather that persists long enough to produce serious effects (crop damage, water supply shortages, etc.). The severity of the drought depends upon the degree of moisture deficiency, the duration, and the size of the affected area.

Drought can affect vast territorial regions and large population numbers. In effect, drought is a silent but very damaging phenomenon that is rarely lethal but enormously destructive. Drought can ruin local and regional economies that are agricultural and tourism based. Drought also creates environmental conditions that increase

risk of other hazards such as fire, flash flood, and possible landslides/debris flow.

Poor water quality management can result in the demand for water exceeding the available supply. This can be exacerbated by fluctuations in regional precipitation, excessive water demand, or rapid residential development.

Emergency water shortages can also be caused by contamination of a water supply. A major spill of a petroleum product or hazardous chemical on a major river can force communities to shut down water treatment plants. Although typically more localized, the contamination of ground water or an aquifer can also disrupt the use of well water.

Water conservation

Conserving water is very important during emergency water shortages. Water saved by one user may be enough to protect the critical needs of others. Irrigation practices can be changed to use less water or crops that use less water can be planted. Cities and towns can ration water, factories can change manufacturing methods, and individuals can practice water-saving measures to reduce consumption. If everyone reduces water use during a drought, more water will be available to share.

1. Practice indoor water conservation:

   General

   - Never pour water down the drain when there may be another use for it. Use it to water your indoor plants or garden.
   - Repair dripping faucets by replacing washers. One drop per second wastes 2,700 gallons of water per year!

   Bathroom

   - Check all plumbing for leaks. Have leaks repaired by a plumber.
   - Consider purchasing a low-volume toilet that uses less than half the water of older models. NOTE: In many areas, low-volume units are required by law.
   - Install a toilet displacement device to cut down on the amount of water needed to flush. Place a one-gallon plastic jug of water into the tank to displace toilet flow (do not use a brick, it may dissolve and loose pieces may cause damage to the internal parts). Be sure installation does not interfere with the operating parts.
   - Don't flush the toilet unnecessarily. Dispose of tissues, insects, and other similar waste in the trash rather than the toilet.
   - Replace your showerhead with an ultra-low-flow version.
   - Do not take baths—take short showers—only turn on water to get wet and lather and then again to rinse off.
   - Place a bucket in the shower to catch excess water for watering plants.
   - Don’t let the water run while brushing your teeth, washing your face or shaving.

   Kitchen

   - Operate automatic dishwashers only when they are fully loaded. Use the “light wash” feature if available to use less water.
   - Hand wash dishes by filling two containers—one with soapy water and the other with rinse water containing a small amount of chlorine bleach.
   - Most dishwashers can clean soiled dishes very well, so dishes do not

have to be rinsed before washing. Just remove large particles of food, and put the soiled dishes in the dishwasher.

- Store drinking water in the refrigerator. Don't let the tap run while you are waiting for water to cool.
- Do not waste water waiting for it to get hot. Capture it for other uses such as plant watering or heat it on the stove or in a microwave.
- Do not use running water to thaw meat or other frozen foods. Defrost food overnight in the refrigerator, or use the defrost setting on your microwave.
- Clean vegetables in a pan filled with water rather than running water from the tap.
- Kitchen sink disposals require a lot of water to operate properly. Start a compost pile as an alternate method of disposing of food waste, or simply dispose of food in the garbage.

Laundry

- Operate automatic clothes washers only when they are fully loaded or set the water level for the size of your load.

Long-term indoor water conservation

- Retrofit all household faucets by installing aerators with flow restrictors.
- Consider installing an instant hot water heater on your sink.
- Insulate your water pipes to reduce heat loss and prevent them from breaking if you have a sudden and unexpected spell of freezing weather.
- If you are considering installing a new heat pump or air-conditioning system, the new air-to-air models are just as efficient as the water-to-air type and do not waste water.
- Install a water-softening system only when the minerals in the water would damage your pipes. Turn the softener off while on vacation.
- When purchasing a new appliance, choose one that is more energy and water efficient.

Conserving water is very important during emergency water shortages. Water saved by one user may be enough to protect the critical needs of others.

2. Practice outdoor water conservation:

General

- If you have a well at home, check your pump periodically. If the automatic pump turns on and off while water is not being used, you have a leak.

Car washing

- Use a shut-off nozzle on your hose that can be adjusted down to a fine spray, so that water flows only as needed.
- Consider using a commercial car wash that recycles water. If you wash your own car, park on the grass so that you will be watering it at the same time.

Lawn Care

- Don't over water your lawn. A heavy rain eliminates the need for watering for up to two weeks. Most of the year, lawns only need one inch of water per week.
- Water in several short sessions rather than one long one in order for your lawn to better absorb moisture.
- Position sprinklers so water lands on the lawn and shrubs and not on paved areas.

- Avoid sprinklers that spray a fine mist. Mist can evaporate before it reaches the lawn. Check sprinkler systems and timing devices regularly to be sure they operate properly.
- Raise the lawn mower blade to at least three inches, or to its highest level. A higher cut encourages grass roots to grow deeper, shades the root system, and holds soil moisture.
- Plant drought-resistant lawn seed.
- Avoid over-fertilizing your lawn. Applying fertilizer increases the need for water. Apply fertilizers that contain slow-release, water-insoluble forms of nitrogen.
- Use a broom or blower instead of a hose to clean leaves and other debris from your driveway or sidewalk.
- Do not leave sprinklers or hoses unattended. A garden hose can pour out 600 gallons or more in only a few hours.

Pool

- Consider installing a new water-saving pool filter. A single back flushing with a traditional filter uses 180 to 250 gallons of water.
- Cover pools and spas to reduce evaporation of water.

Long term outdoor conservation

- Plant native and/or drought-tolerant grasses, ground covers, shrubs and trees. Once established, they do not need water as frequently and usually will survive a dry period without watering. Small plants require less water to become established. Group plants together based on similar water needs.
- Install irrigation devices that are the most water efficient for each use. Micro and drip irrigation and soaker hoses are examples of efficient devices.
- Use mulch to retain moisture in the soil. Mulch also helps control weeds that compete with landscape plants for water.
- Avoid purchasing recreational water toys that require a constant stream of water.
- Avoid installing ornamental water features (such as fountains) unless they use recycled water.

Participate in public water conservation programs of your local government, utility or water management district. Follow water conservation and water shortage rules in effect. Remember, you are included in the restrictions even if your water comes from a private well. Be sure to support community efforts that help develop and promote a water conservation ethic.

Contact your local water authority, utility district, or local emergency management agency for information specific to your area.

Earthquakes

An earthquake is a sudden shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. Earthquakes can cause buildings and bridges to collapse, telephone and power lines to fall, and result in fires, explosions and landslides. Earthquakes can also cause huge ocean waves, called tsunamis, which travel long distances over water until they crash into coastal areas.

The following information includes general guidelines for earthquake preparedness and safety. Because injury prevention techniques may vary from state to state, it is recommended that you contact your local emergency management office, health department, or American Red Cross chapter for more information.

What to do before an earthquake

1. Know the terms associated with earthquakes.
   - **Earthquake**—a sudden slipping or movement of a portion of the earth's crust, accompanied and followed by a series of vibrations.
   - **Aftershock**—an earthquake of similar or lesser intensity that follows the main earthquake.
   - **Fault**—the fracture across which displacement has occurred during an earthquake. The slippage may range from less than an inch to more than 10 yards in a severe earthquake.
   - **Epicenter**—the place on the earth's surface directly above the point on the fault where the earthquake rupture began. Once fault slippage begins, it expands along the fault during the earthquake and can extend hundreds of miles before stopping.
   - **Seismic Waves**—are vibrations that travel outward from the earthquake fault at speeds of several miles per second. Although fault slippage directly under a structure can cause considerable damage, the vibrations as seismic wave pass by cause most of the destruction during earthquakes.
   - **Magnitude**—computed from the amplitude of the seismic waves, the magnitude indicates how much energy was released during an earthquake. A magnitude of 7.0 on the Richter Scale would indicate a very strong earthquake. Each whole number on the scale represents an increase of about 30 times the energy released. Therefore, an earthquake measuring 6.0 is about 30 times more powerful than one measuring 5.0.
2. Look for items in your home that could become a hazard in an earthquake:
   - Repair defective electrical wiring, leaky gas lines, and inflexible utility connections. Get appropriate professional help. Do not work with gas or electrical lines yourself.
   - Bolt down and secure to wall your water heater, refrigerator, furnace,

and gas appliances. If recommended by your gas company, have an automatic gas shut-off valve installed that is triggered by strong vibrations).

- Place large or heavy objects on lower shelves. Fasten shelves, mirrors, and large picture frames to walls. Brace high and top-heavy objects.
- Store bottled foods, glass, china and other breakables on low shelves or in cabinets that can fasten shut.
- Anchor overhead lighting fixtures.
- Be sure the residence is firmly anchored to its foundation.
- Install flexible pipe fittings to avoid gas or water leaks. Flexible fittings are more resistant to breakage.

3. Know where and how to shut off electricity, gas and water at main switches and valves. Check with your local utilities for instructions. Do not actually shut off the gas to see how it works or to show others. Only the gas company can safely turn it back on.

4. Hold earthquake drills with your household members:
   - Locate safe spots in each room under a sturdy table or against an inside wall. Reinforce this information by physically placing yourself and your household in these locations.

5. Develop a plan for reuniting your household after an earthquake. Establish an out-of-town telephone contact for household members to call to let others know that they are safe.

6. Review your insurance policies. Some damage may be covered even without specific earthquake insurance. Protect important home and business papers.

7. Prepare to survive on your own for at least three days. Assemble a disaster supplies kit. Keep a stock of food and extra drinking water. See the "Emergency Planning and Disaster Supplies" and "Evacuation" chapters for more information.

What to do during an earthquake

Remain calm and stay inside during an earthquake. Most injuries during earthquakes occur when people are hit by falling debris when entering or exiting buildings.

Stay inside until the shaking stops and it is safe to go outside. Most injuries during earthquakes occur when people are hit by falling objects when entering or exiting buildings.

1. Drop, Cover and Hold On! Minimize your movements during an earthquake to a few steps to a nearby safe place. Stay indoors until the shaking has stopped and you are sure exiting is safe.

2. If you are **indoors**, take cover under a sturdy desk, table or bench, or against an inside wall, and hold on. Stay away from glass, windows, outside doors or walls and anything that could fall, such as lighting fixtures or furniture. If you are in bed, stay there, hold on and protect your head with a pillow, unless you are under a heavy light fixture that could fall.

3. If there isn't a table or desk near you, cover your face and head with your arms and crouch in an inside corner of the building. A doorway should only be used for shelter if it is in close proximity to you and if you know that it is a strongly supported load-bearing doorway.

4. If you are **outdoors**, stay there. Move away from buildings, streetlights and utility wires.

5. If you live in an **apartment building** or other multi-household structure with many levels, consider the following:
   - Get under a desk and stay away from windows and outside walls.
   - Stay in the building (many injuries occur as people flee a building and are struck by falling debris from above).
   - Be aware that the electricity may go out or the sprinkler systems or fire alarms may come on.
   - DO NOT use the elevators.

6. If you are in a crowded indoor **public location**:
   - Stay where you are. Do not rush for the doorways.
   - Move away from tall objects that may fall.
   - Take cover and grab something to shield your head and face from falling debris and glass.
   - Be aware that the electricity may go out or the sprinkler systems or fire alarms may turn on.
   - DO NOT use elevators.

7. In a moving **vehicle**, stop as quickly as safety permits, and stay in the vehicle. Avoid stopping near or under buildings, trees, overpasses or utility wires. Then, proceed cautiously, watching for road and bridge damage.

8. If you become trapped in debris:
   - Do not light a match.
   - Do not move about or kick up dust.
   - Cover your mouth with a handkerchief or clothing.
   - Tap on a pipe or wall so rescuers can locate you. Use a whistle if one is available. Shout only as a last resort—shouting can cause you to inhale dangerous amounts of dust.

9. Stay indoors until the shaking has stopped and you are sure exiting is safe.

What to do after an earthquake

If you must go out after an earthquake, watch for fallen objects, downed electrical wires, weakened walls, bridges, roads and sidewalks.

1. Be prepared for aftershocks. These secondary shock waves are usually less violent than the main quake but can be strong enough to do additional damage to weakened structures.

2. Check for injuries. Do not attempt to move seriously injured persons unless they are in immediate danger of death or further injury. If you must move an unconscious person, first stabilize the neck and back, then call for help immediately.
   - If the victim is not breathing, carefully position the victim for artificial respiration, clear the airway and start mouth-to-mouth resuscitation.
   - Maintain body temperature with blankets. Be sure the victim does not become overheated.
   - Never try to feed liquids to an unconscious person.

3. If the electricity goes out, use flashlights or battery powered lanterns. Do not use candles, matches or open flames indoors after the earthquake because of possible gas leaks.

4. Wear sturdy shoes in areas covered with fallen debris and broken glass.

5. Check your home for structural damage. If you have any doubts about safety, have your residence inspected by a qualified building inspector or structural engineer before entering.
6. Visually check chimneys for visual damage; however, have a qualified professional inspect the chimney for internal damage before lighting a fire.
7. Clean up spilled medicines, bleaches, gasoline and other flammable liquids. Evacuate the building if gasoline or other fumes are detected and the building is not well ventilated. Ventilate by opening windows and doorways to the outside.
8. Visually inspect utility lines and appliances for damage.
   - If you smell gas or hear a hissing or blowing sound, open a window and leave. Shut off the main gas valve if it is located outside. Report the leak to the gas company from the nearest working phone or cell phone. Stay out of the building. If you shut off the gas supply at the main valve, you will need to contact your gas comapny to have it turned back on.
   - Switch off electrical power at the main fuse box or circuit breaker if electrical damage is suspected or known.
   - Always turn off the gas before you turn off the electricity.
   - Shut off the water supply at the main valve if interior water pipes are damaged.
   - Do not flush toilets until you know that sewage lines are intact.
9. Open cabinets cautiously. Beware of objects that can fall off shelves.
10. Use the phone only to report life-threatening emergencies.
11. Listen to news reports for the latest emergency information.
12. Stay off the streets. If you must go out, watch for fallen objects, downed electrical wires, weakened walls, bridges, roads and sidewalks.
13. Stay away from damaged areas unless your assistance has been specifically requested by police, fire or relief organizations.
14. If you live in coastal areas, be aware of possible tsunamis, also known as seismic sea waves (mistakenly called "tidal waves"). When local authorities issue a tsunami warning, assume that a series of dangerous waves is on the way. Stay away from the beach. See the "Tsunamis" chapter for more information.

Volcanoes

A volcano is a vent through which molten rock escapes to the earth's surface. When pressure from gases within the molten rock becomes too great, an eruption occurs.

Some eruptions are 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. Lateral blasts can flatten-trees for miles. Hot, sometimes poisonous, gases may flow down the sides of the of the volcano.

Lava flows are streams of molten rock that either pour from a vent quietly through lava tubes or 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.

Fresh volcanic ash, made of pulverized rock, can be abrasive, acidic, gritty, glassy and odorous. While not immediately dangerous to most adults, the combination of acidic gas and ash could cause lung damage to small infants, very old people or those suffering from severe respiratory illnesses. Volcanic ash can also damage machinery, including engines and electrical equipment. Ash accumulations mixed with water become heavy and can collapse roofs.

Volcanic eruptions can be accompanied by other natural hazards: earthquakes, mudflows and flash floods, rock falls and landslides, acid rain, fire, and (under special conditions) tsunamis. Active volcanoes in the U.S. are found mainly in Hawaii, Alaska and the Pacific Northwest.

What to do before an eruption

1. Make evacuation plans. If you live in a known volcanic hazard area, plan a route out and have a backup route in mind.
2. Develop a household disaster plan. In case household members are separated from one another during a volcanic eruption (a real possibility during the day when adults are at work and children are at school), have a plan for getting back together. Ask an out-of-town relative or friend to serve as the "household contact," because after a disaster, it's often easier to call long distance. Make sure everyone knows the name, address, and phone number of the contact person.

The May 18, 1980 eruption of Mount St. Helens in Washington took the lives of 58 people and caused property damage in excess of $1.2 billion.

3. Assemble a disaster supplies kit (see "Emergency Planning and Disaster Supplies" chapter).
4. Get a pair of goggles and a throw-away breathing mask for each member of the household in case of ashfall.
5. Do not visit an active volcano site unless officials designate a safe viewing area.

What to do during an eruption

1. If close to the volcano evacuate immediately away from the volcano to avoid flying debris, hot gases, lateral blast, and lava flow.
2. Avoid areas downwind from the volcano to avoid volcanic ash.
3. Be aware of mudflows. The danger from a mudflow increases as you approach a stream channel and decreases as you move away from a stream channel toward higher ground. This danger increases with prolonged heavy rains. Mudflows can move faster than you can walk or run. Look upstream before crossing a bridge, and do not cross if the mudflow is approaching. Avoid river valleys and low-lying areas.

4. Stay indoors until the ash has settled unless there is danger of the roof collapsing.
5. During an ash fall, close doors, windows, and all ventilation in the house (chimney vents, furnaces, air conditioners, fans and other vents).
6. Do not drive in heavy ashfall unless absolutely required. If you do drive in dense ashfall, keep speed down to 35 mph or slower.
7. Remove heavy ash from flat or low-pitched roofs and rain gutters.
8. 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. Follow these precautions to keep yourself safe from ashfall:
   - Wear long-sleeved shirts and long pants.
   - Use goggles and wear eyeglasses instead of contact lenses.
   - Use a dust mask or hold a damp cloth over your face to help breathing.
   - Do not run car or truck engines. Driving can stir up volcanic ash that can clog engines and stall vehicles. Moving parts can be damaged from abrasion, including bearings, brakes, and transmissions.

What to do after the eruption

1. Stay away from ashfall areas if possible. If you are in an ashfall area cover your mouth and nose with a mask, keep skin covered, and wear goggles to protect the eyes.
2. Clear roofs of ashfall because it can be very heavy and may cause buildings to collapse. Exercise great caution when working on a roof.
3. Do not drive through ashfall, which is easily stirred up and can clog engine air filters, causing vehicles to stall.
4. 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.

Landslides and Debris Flows (Mudslides)

Landslides occur in all U.S. states and territories and occur when masses of rock, earth, or debris move down a slope. Landslides may be small or large, and can move at slow or very high speeds. They are activated by rainstorms, earthquakes, volcanic eruptions, fires and by human modification of the land.

Debris and mud flows are rivers of rock, earth, and other debris saturated with water. They develop when water rapidly accumulates in the ground, during heavy rainfall or rapid snowmelt, changing the earth into a flowing river of mud or "slurry." They can flow rapidly down slopes or through channels, and can strike with little or no warning at avalanche speeds. They can also travel several miles from their source, growing in size as they pick up trees, large boulders, cars, and other materials along the way.

Landslide, mudflow, and debris-flow problems are occasionally caused by land mismanagement. Improper land-use practices on ground of questionable stability, particularly in mountain, canyon, and coastal regions, can create and accelerate serious landslide problems. Land-use zoning, professional inspections, and proper design can minimize many landslide, mudflow, and debris flow problems.

What to do before a landslide or debris flow

1. Contact your local emergency management office or American Red Cross chapter for information on local landslide and debris flow hazards.
2. Get a ground assessment of your property.
   - County or state geological experts, local planning department or departments of natural resources may have specific information on areas vulnerable to landslides. Consult an appropriate professional expert for advice on corrective measures you can take.
3. Minimize home hazards by having flexible pipe fittings installed to avoid gas or water leaks. Flexible fitting are more resistant to breakge. Only the gas company or professionals should install gas fittings.
4. Familiarize yourself with your surrounding area.
   - Small changes in your local landscape could alert you to the potential of greater future threat.
   - Observe the patterns of storm-water drainage on slopes and especially the places where runoff water converges.
   - Watch for any sign of land movement, such as small slides, flows, or

progressively leaning trees, on the hillsides near your home.

5. Be particularly observant of your surrounding area before and during intense storms that could heighten the possibility of landslide or debris. Many debris flow fatalities occur when people are sleeping.
6. Talk to your insurance agent. Debris flow may be covered by flood insurance policies from the National Flood Insurance Program (NFIP).
7. Learn to recognize landslide warning signs.
   - Doors or windows stick or jam for the first time.
   - New cracks appear in plaster, tile, brick, or foundations.
   - Outside walls, walks, or stairs begin pulling away from the building.
   - Slowly developing, widening cracks appear on the ground or on paved areas such as streets or driveways.
   - Underground utility lines break.
   - Bulging ground appears at the base of a slope.
   - Water breaks through the ground surface in new locations.
   - Fences, retaining walls, utility poles, or trees tilt or move.
   - The ground slopes downward in one specific direction and may begin shifting in that direction under your feet.

Landslides and debris flows can cause such dangers as broken electrical, water, gas, and sewage lines, and disrupted roadways and railways.

What to do during a heightened threat (intense storm) of landslide or debris flow

1. Listen to radio or television for warning of intense rainfall.
   - Be prepared to evacuate if instructed by local authorities or if you feel threatened.
   - Should you remain at home, move to a second story if possible to distance yourself from the direct path of debris flow and landslide debris.

2. Be alert when intense, short bursts of rain follow prolonged heavy rains or damp weather, which increase risks of debris flows.

3. 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. You may hear a faint rumbling sound that increases in volume as a landslide nears.

4. If you are near a stream or channel, be alert for sudden increases or decreases in water flow and for a change from clear to muddy water. Such changes may indicate landslide activity upstream. Be prepared to move quickly.
5. Be especially alert when driving. Embankments along roadsides are particularly susceptible to landslides. Watch for collapsed pavement, mud, fallen rocks, and other indications of possible debris flows.

6. Evacuate when ordered by local authorities or if you feel the need. See the "Evacuation" chapter for more information.

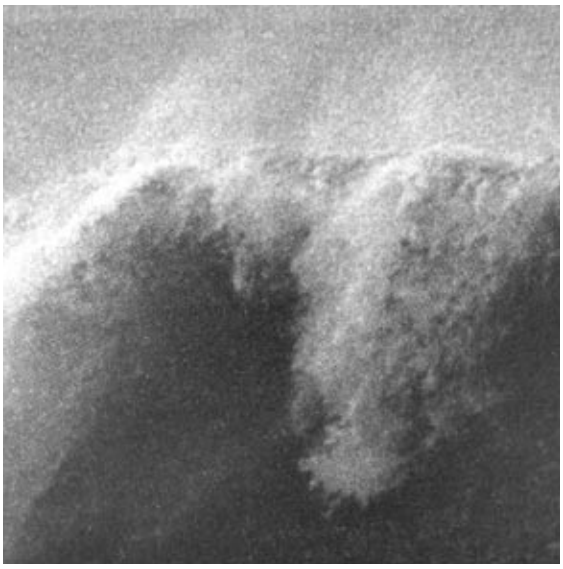
What to do during a landslide or debris flow

1. Quickly move away from the path of a landslide or debris flow.
2. Areas generally considered safe include:
   - Areas that have not moved in the past
   - Relatively flat-lying areas away from drastic changes in slope
   - Areas at the top of or along ridges set back from the tops of slopes.
3. If escape is not possible, curl into a tight ball and protect your head.

What to do after a landslide or debris flow

1. Stay away from the slide area. There may be danger of additional slides.
2. Check for injured and trapped persons near the slide, without entering the direct slide area. Direct rescuers to their locations.
3. Help a neighbor who may require special assistance—large families, children, elderly people, and people with disabilities.
4. Listen to local radio or television stations for the latest emergency information.
5. Landslides and debris flows can provoke associated dangers such as broken electrical, water, gas, and sewage lines, and disrupt roadways and railways.
   - 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.
   - If you smell gas or hear hissing, do not enter a building to turn off utilities. If you can turn the gas off outside the building at the meter, do so. However, only the gas company or other qualified professionals can turn the gas back on.
   - 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.
6. 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.
7. Replant damaged ground as soon as possible since erosion caused by loss of ground cover can lead to flash flooding and additional landslides in the near future.
8. 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.
9. See the "Recovering From Disaster" chapter for more information.

Tsunamis



Tsunamis (pronounced soo-ná-mees), also known as siesmic sea waves (mistakenly called "tidal waves"), are a series of enormous waves created by an underwater disturbance such as an earthquake. A tsunami can move hundreds of miles per hour in the open ocean and smash into land with waves as high as 100 feet or more, although most waves are less than 18 feet high.

From the area where the tsunami originates, waves travel outward in all directions much like the ripples caused by throwing a rock into a pond. In deep water the tsunami wave is not noticeable. Once the wave approaches the shore it builds in height. All tsunamis are potentially dangerous, even though they may not damage every coastline they strike. A tsunami can strike anywhere along most of the U.S. coastline. The most destructive tsunamis have occurred along the coasts of California, Oregon, Washington, Alaska and Hawaii.

Take tsunami warnings seriously. Follow local instructions.

Tsunamis are most often generated by earthquake-induced movement of the ocean floor. Landslides, volcanic eruptions, and even meteorites can also generate tsunamis. If a major earthquake or landslide occurs close to shore, the first wave in a series could reach the beach in a few minutes, even before a warning is issued. Areas are at greater risk if less than 25 feet above sea level and within a mile of the shoreline. Drowning is the most common cause of death associated with a tsunami. Tsunami waves and the receding water are very destructive to structures in the run-up zone. Other hazards include flooding, contamination of drinking water and fires from gas lines or ruptured tanks.

What to do before a tsunami

1. Know the terms used by the West Coast/Alaska Tsunami Warning Center (WC/ATWC—responsible for tsunami warnings for California, Oregon, Washington, British Columbia, and Alaska) and the Pacific Tsunami Warning Center (PTWC—responsible for tsunami warnings to international authorities, Hawaii, and the U.S. territories within the Pacific basin).

   • **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.

   • **Watch**—A tsunami was or may have been generated, but is at least two hours travel time to the area in Watch status.

   • **Warning**—A tsunami was or may have been generated, which could cause damage; therefore, people in the warned area are strongly advised to evacuate.

2. Listen to radio or television for more information and follow the instructions of your local authorities.

3. Immediate warning of tsunamis sometimes comes in the form of a noticeable recession in water away from the shoreline. This is nature's tsunami warning and it should be heeded by moving inland to higher ground immediately

4. If you feel an earthquake in a coastal area, leave the beach lor low-lying areas. Then turn on your radio to learn if there is a tsunami warning.

5. Know that a small tsunami at one beach can be a larger wave a few miles away. The topography of the coastline and the ocean floor will influence the size of the wave.

6. A tsunami may generate more than one wave. Do not let the modest size of one wave allow you to forget how dangerous a tsunami is. The next wave may be bigger.

7. Prepare for possible evacuation. Learn evacuation routes. Determine where you would go and how you would get there if you needed to evacuate. See the "Evacuation" and "Emergency Planning and Disaster Supplies" chapters for information.

Do not let the modest size of one wave allow you to forget how dangerous tsunamis are. The next wave in the series may be much larger.

What to do during a tsunami

1. If you are advised to evacuate, do so immediately.

2. Stay away from the area until local authorities say it is safe. Do not be fooled into thinking that the danger is over after a single wave—a tsunami is not a single wave but a series of waves that can vary in size.

3. Do not go to the shoreline to watch for a tsunami. When you can see the wave, it is too late to escape.

What to do after a tsunami

1. Stay away from flooded and damaged areas until officials say it is safe to return.

2. Stay away from debris in the water, it may pose a safety hazard to boats and people.

3. See the "Recovering From Disaster" chapter for more information.

Fire

Each year more than 4000 Americans die and more than 25,000 are injured in fires, many of which could be prevented. Direct property loss due to fires is estimated at $8.6 billion annually.

To protect yourself, it's important to understand the basic characteristics of fire. Fire spreads quickly; there is no time to gather valuables or make a phone call. In just two minutes a fire can become life threatening. In five minutes a residence can be engulfed in flames.

Working smoke alarms decrease your chances of dying in fire by half.

Heat and smoke from fire can be more dangerous than the flames. Inhaling the super-hot air can sear your lungs. Fire produces poisonous gases that make you disoriented and drowsy. Instead of being awakened by a fire, you may fall into a deeper sleep. Asphyxiation is the leading cause of fire deaths, exceeding burns, by a three-to-one ratio.

What to do before fire strikes

1. Install smoke alarms. Properly working smoke alarms decrease your chances of dying in a fire by half.
   - Place smoke alarms on every level of your residence: outside bedrooms on the ceiling or high on the wall (4 to 12 inches from ceiling), at the top of open stairways or at the bottom of enclosed stairs and near (but not in) the kitchen.
   - Test and clean smoke alarms once a month and replace batteries at least once a year. Replace smoke alarms once every 10 years.
2. With your household, plan two escape routes from every room in the residence. Practice with your household escaping from each room.
   - Make sure windows are not nailed or painted shut. Make sure security gratings on windows have a fire safety-opening feature so that they can be easily opened from the inside.
   - Consider escape ladders if your residence has more than one level and ensure that burglar bars and other antitheft mechanisms that block outside window entry are easily opened from inside.
   - Teach household members to stay low to the floor (where the air is safer in a fire) when escaping from a fire.
   - Pick a place outside your home for the household to meet after escaping from a fire.
3. Clean out storage areas. Don't let trash such as old newspapers and magazines accumulate.
4. Check the electrical wiring in your residence.

- Inspect extension cords for frayed or exposed wires or loose plugs.
- Outlets should have cover plates and no exposed wiring.
- Make sure wiring does not run under rugs, over nails, or across high traffic areas.
- Do not overload extension cords or outlets. If you need to plug in two or three appliances, get a UL-approved unit with built-in circuit breakers to prevent sparks and short circuits.
- Make sure home insulation does not touch electrical wiring.
- Have an electrician check the electrical wiring in your residence.

5. Never use gasoline, benzine, naptha or similar flammable liquids indoors.
   - Store flammable liquids in approved containers in well-ventilated storage areas.
   - Never smoke near flammable liquids.
   - After use, safely discard all rags or materials soaked in flammable material outdoors in a metal container.
6. Check heating sources. Many residential fires are started by faulty furnaces or stoves, cracked or rusted furnace parts and chimneys with creosote build-up. Have chimneys, wood stoves and all residential heating systems inspected and cleaned annually by a certified specialist.
7. Insulate chimneys and place spark arresters on top. The chimney should be at least three feet higher than the roof. Remove branches hanging above and around the chimney.
8. Be careful when using alternative heating sources, such as wood, coal and kerosene heaters and electrical space heaters.
   - Check with your local fire department on the legality of using kerosene heaters in your community. Be sure to fill kerosene heaters outside and after they have cooled.
   - Place heaters at least three feet away from flammable materials. Make sure the floor and nearby walls are properly insulated.
   - Use only the type of fuel designated for your unit and follow manufacturer's instructions.
   - Store ashes in a metal container outside and away from your residence.
   - Keep open flames away from walls, furniture, drapery and flammable items. Keep a screen in front of the fireplace.
   - Have chimneys and wood stoves inspected annually and cleaned if necessary.
   - Portable heaters that use flammable fuels should only be used in well-ventilated rooms.

Install A-B-C type fire extinguishers in the home and teach household members how to use them.

9. Keep matches and lighters up high, away from children, and if possible, in a locked cabinet.
10. Do not smoke in bed, or when drowsy or medicated. Provide smokers with deep, sturdy ashtrays. Douse cigarette and cigar butts with water before disposal.
11. Safety experts recommend that you sleep with your door closed.
12. Know the locations of the gas valve and electric fuse or circuit breaker box and how to turn them off in an emergency. If you shut off your main gas line for

any reason, allow only a gas company representative to turn it on again.

13. Install A-B-C type fire extinguishers in the residence and teach household members how to use them (*Type A*—wood or papers fires only; *Type B*—flammable liquid or grease fires; *Type C*—electrical fires; *Type A-B-C*—rated for all fires and recommended for the residence).

14. Consider installing an automatic fire sprinkler system in your residence.

15. Ask your local fire department to inspect your residence for fire safety and prevention.

16. Teach children how to report a fire and when to call 911.

17. To support insurance claims in case you do have a fire, conduct an inventory of your property and possessions and keep the list in a separate location. Photographs are also helpful.

18. See the "Emergency Planning and Disaster Supplies" chapter for additional information.

If your clothes are on fire, stop, drop, and roll until the fire is extinguished.

What to do during a fire

1. Use water or a fire extinguisher to put out small fires. Do not try to put out a fire that is getting out of control. If you're not sure if you can control it, get everyone out of the residence and call the fire department from a neighbor's residence.

2. Never use water on an electrical fire. Use only a fire extinguisher approved for electrical fires.

3. Smother oil and grease fires in the kitchen with baking soda or salt, or put a lid over the flame if it is burning in a pan. Do not attempt to take the pan outside.

4. If your clothes catch on fire, **stop, drop** and **roll** until the fire is extinguished. Running only makes the fire burn faster.

5. If you are escaping through a closed door, use the back of your hand to feel the top of the door, the doorknob, and the crack between the door and door frame before you open it. **Never** use the palm of your hand or fingers to test for heat—burning those areas could impair your ability to escape a fire (i.e., ladders and crawling).

   - If the door is cool, open slowly and ensure fire and/or smoke is not blocking your escape route. If your escape route is blocked, shut the door immediately and use an alternate escape route, such as a window. If clear, leave immediately through the door. Be prepared to crawl. Smoke and heat rise. The air is clearer and cooler near the floor.
   - If the door is warm or hot, do not open. Escape through a window. If you cannot escape, hang a white or light-colored sheet outside the window, alerting fire fighters to your presence.

6. If you must exit through smoke, crawl low under the smoke to your exit—heavy smoke and poisonous gases collect first along the ceiling.

7. Close doors behind you as you escape to delay the spread of the fire.

8. Once you are safely out, stay out. Call 911.

What to do after a fire

1. Give first aid where needed. After calling 911 or your local emergency number, cool and cover burns to reduce chance of further injury or infection.
2. Do not enter a fire-damaged building unless authorities say it is safe.
3. If you must enter a fire-damaged building, be alert for heat and smoke. If you detect either, evacuate immediately.
4. Have an electrician check your residence's wiring before the current (power) is turned on.
5. Do not attempt to reconnect any utilities yourself. Leave this to the fire department and other authorities.
6. Beware of structural damage. Roofs and floors may be weakened and need repair.
7. Contact your local disaster relief service, such as the American Red Cross or Salvation Army, if you need housing, food, or a place to stay.
8. Call your insurance agent.
   - Make a list of damage and losses. Pictures are helpful.
   - Keep records of clean-up and repair costs. Receipts are important for both insurance and income tax claims.
   - Do not throw away any damaged goods until an official inventory has been taken. Your insurance company takes all damages into consideration.
9. If you are a tenant, contact the landlord. It's the property owner's responsibility to prevent further loss or damage to the site.
10. Secure personal belongings or move them to another location.
11. Discard food, beverages and medicines that have been exposed to heat, smoke or soot. Refrigerators and freezers left closed hold their temperature for a short time. Do not attempt to refreeze food that has thawed.
12. If you have a safe or strong box, do not try to open it. It can hold intense heat for several hours. If the door is opened before the box has cooled, the contents could burst into flames.
13. If a building inspector says the building is unsafe and you must leave your home:
    - Ask local police to watch the property during your absence.
    - Pack identification, medicines, glasses, jewelry, credit cards, checkbooks, insurance policies and financial records if you can reach them safely.
    - Notify friends, relatives, police and fire departments, your insurance agent, the mortgage company, utility companies, delivery services, employers, schools and the post office of your whereabouts.
14. See the "Shelter" and "Recovering From Disaster" chapters for more information.

Wildland fires

If you live on a remote hillside, or in a valley, prairie or forest where flammable vegetation is abundant, your residence could be vulnerable to wildland fire. These fires are usually triggered by lightning or accidents.

1. Fire facts about rural living:
   - Once a fire starts outdoors in a rural area, it is often hard to control. Wildland firefighters are trained to protect natural resources, not homes and buildings.
   - Many homes are located far from fire stations. The result is longer emergency response times. Within a matter of minutes, an entire home may be destroyed by fire.
   - Limited water supply in rural areas can make fire suppression difficult.
   - Homes may be secluded and surrounded by woods, dense brush and combustible vegetation that fuel fires.
2. Ask fire authorities for information about wildland fires in your area. Request that they inspect your residence and property for hazards.
3. Be prepared and have a fire safety and evacuation plan:
   - Practice fire escape and evacuation plans.
   - Mark the entrance to your property with address signs that are clearly visible from the road.
   - Know which local emergency services are available and have those numbers posted near telephones.
   - Provide emergency vehicle access through roads and driveways at least 12 feet wide with adequate turn-around space.
4. Tips for making your property fire resistant:
   - Keep lawns trimmed, leaves raked, and the roof and rain-gutters free from debris such as dead limbs and leaves.
   - Stack firewood at least 30 feet away from your residence.
   - Store flammable materials, liquids and solvents in metal containers outside the residence at least 30 feet away from structures and wooden fences.
   - Create defensible space by thinning trees and brush within 30 feet around your residence. Beyond 30 feet, remove dead wood, debris and low tree branches.
   - Landscape your property with fire resistant plants and vegetation to prevent fire from spreading quickly. For example, hardwood trees are more fire-resistant than pine, evergreen, eucalyptus, or fir trees.
   - Make sure water sources, such as hydrants, ponds, swimming pools and wells, are accessible to the fire department.
5. Protect your residence:
   - Use fire resistant, protective roofing and materials like stone, brick and metal to protect your residence. Avoid using wood materials. They offer the least fire protection.

- Cover all exterior vents, attics and eaves with metal mesh screens no larger than 6 millimeters or 1/4 inch to prevent debris from collecting and to help keep sparks out.
- Install multi-pane windows, tempered safety glass or fireproof shutters to protect large windows from radiant heat.
- Use fire-resistant draperies for added window protection.
- Have chimneys, wood stoves and all home heating systems inspected and cleaned annually by a certified specialist.
- Insulate chimneys and place spark arresters on top. Chimney should be at least three feet above the roof.
- Remove branches hanging above and around the chimney.

6. Follow local burning laws:
   - Do not burn trash or other debris without proper knowledge of local burning laws, techniques and the safest times of day and year to burn.
   - Before burning debris in a wooded area, make sure you notify local authorities and obtain a burning permit.
   - Use an approved incinerator with a safety lid or covering with holes no larger than 3/4 inches.
   - Create at least a 10-foot clearing around the incinerator before burning debris.
   - Have a fire extinguisher or garden hose on hand when burning debris.
7. If wildfire threatens your residence and time permits, consider the following:

   Inside
   - Shut off gas at the meter. Do not actually shut off the gas to see how it works or to show others. Only the gas company can safely turn the gas back on.
   - Open fireplace damper. Close fireplace screens.
   - Close windows, vents, doors, blinds or noncombustible window coverings, and heavy drapes. Remove flammable drapes and curtains.
   - Move flammable furniture into the center of the residence away from windows and sliding-glass doors.
   - Close all interior doors and windows to prevent drafts.
   - Place valuables that will not be damaged by water in a pool or pond.
   - Gather pets into one room. Make plans to care for your pets if you must evacuate.
   - 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 and the car doors unlocked. Close garage windows and doors, but leave them unlocked. Disconnect automatic garage door openers.

   Outside
   - Seal attic and ground vents with precut plywood or commercial seals.
   - Turn off propane tanks.
   - Place combustible patio furniture inside.
   - Connect garden hose to outside taps. Place lawn sprinklers on the roof and near above-ground fuel tanks. Wet the roof.
   - Wet or remove shrubs within 15 feet of the home.
   - Gather fire tools such as a rake, axe, handsaw or chainsaw, bucket, and shovel.
8. If advised to evacuate, do so immediately. Choose a route away from the fire hazard. Watch for changes in the speed and direction of fire and smoke.
9. See the “Evacuation” chapter for detailed information about evacuation preparedness. Also see the “Recovering from Disaster” and “Shelters” chapters for additional information.

Technological Hazards

HAZARDOUS MATERIALS INCIDENTS

HOUSEHOLD CHEMICAL EMERGENCIES

NUCLEAR POWER PLANTS

NATIONAL SECURITY EMERGENCIES

TERRORISM

CHEMICAL AND BIOLOGICAL WEAPONS

NUCLEAR AND RADIOLOGICAL ATTACK

HOMELAND SECURITY ADVISORY SYSTEM

Hazardous Materials Incidents

Chemicals are found everywhere: they purify drinking water, increase crop production, and simplify household chore. But the same chemical properties that can help us can also be hazardous to humans or the environment if chemicals are used or released improperly or accidentally. Hazards can occur during production, storage, transportation, us or disposal. You, your family members, neighbors, and your local community are the ones at risk if a chemical is used unsafely or relased in harmful amounts into the environment where you live, work or play.

If you witness a hazardous materials accident, call 911, your local emergency notification number or the fire department.

Chemical plants are one source of hazardous materials, but there are many others. Your local service station stores gasoline and diesel fuel, hospitals store a range of radioactive and flammable materials, and there are about 30,000 hazardous materials waste sites in the country.

Many communities have Local Emergency Planning Committees (LEPCs) that identify industrial hazardous materials and keep the community informed of the potential risk. All companies that have hazardous chemicals must report annually to the LEPC. The public is encouraged to participate in the process. Contact your local emergency management office to find out if your community has an LEPC and how you can participate.

What to do before a hazardous materials incident

1. Ask your local emergency management office (or fire or police department) about warning procedures. These could include:
   - Outdoor warning sirens or horns.
   - Emergency Alert System (EAS)—Information provided via radio and television.
   - "All-Call" telephoning—An automated system for sending recorded messages.
   - News media—Radio, television and cable.
   - Residential route alerting—Messages announced to neighborhoods from vehicles equipped with public address systems.
2. Ask your LEPC or emergency management office about community plans for responding to a hazardous materials accident at a plant or other facility, or a transportation accident involving hazardous materials.

3. Ask your LEPC about storage and usage of hazardous chemicals in your local area.

4. Use the information gathered from LEPC and local emergency management offices to evaluate risks to your household. Determine how close you are to factories, freeways, or railroads that may produce or transport toxic waste.

5. Be prepared to evacuate. An evacuation could last for a few hours or several days. See the "Evacuation" and "Emergency Planning and Disaster Supplies" chapters for important information.

6. Be prepared to shelter-in-place; that is, to seek safety in your home or any other building you might be in at the time of a chemical release. At home you should select a room to be used as a shelter. The shelter room for use in case of a hazardous material incident should be above ground, large enough to accommodate all household members and pets, and should have the fewest possible exterior doors and windows. When selecting a shelter-in-place, avoid the furnace or utility room. You should also assemble a shelter kit to be used to seal the shelter room during a chemical release. The kit should include plastic sheeting, duct tape, scissors, and modeling clay or other material to stuff into cracks.

An evacuation due to a hazardous materials incident could last for a few hours or several days. Be prepared in advance.

What to do during a hazardous materials incident

1. If you witness a hazardous materials accident where smoke or fumes are being released, call 911, your local emergency notification number or the fire department as soon as safely possible.

2. If you hear a warning signal, listen to local radio or television stations for further information. Follow instructions carefully.

3. Stay away from the incident site to minimize the risk of contamination. Remember that some toxic chemicals are odorless.

4. If you are caught outside during an incident, remember that gases and mists are generally heavier than air. Try to stay upstream, uphill and upwind—hazardous materials can quickly be transported by water and wind. In general, try to go at least one-half mile (8 –10 city blocks) from the danger area; for many incidents you will need to go much further.

5. If you are in a motor vehicle, stop and seek shelter in a permanent building if possible. If you must remain in your car, keep car windows and vents closed and shut off the air conditioner and heater.

6. If asked to evacuate your home, do so immediately.
   - If authorities indicate there is enough time, close all windows, shut vents and turn off attic, heating and air conditioning fans to minimize contamination.
   - See the "Evacuation" chapter for more information.

7. If you are requested to stay indoors (shelter-in-place) rather than evacuate:
   - Follow all instructions given by emergency authorities.
   - Get household members and pets inside as quickly as possible.
   - Close and lock all exterior doors and windows. Close vents, fireplace dampers and as many interior doors as possible.
   - Turn off air conditioners and ventilation systems. In large buildings, building superintendents should set all ventilation systems to 100 percent recirculation so that no outside air is drawn into the building. If this is not possible, ventilation systems should be turned off.
   - Go into the pre-selected shelter room (the above-ground room with the fewest openings to the outside). Take a battery-powered radio, water, sanitary supplies, a flashlight, and the shelter kit containing plastic sheeting, duct tape, scissors, and modeling clay or other materials to stuff into cracks.
   - Close doors and windows in the room. Tape around the sides, bottom, and top of the door. Cover each window and vent in the room with a single piece of plastic sheeting, taping all around the edges of the sheeting to provide a continuous seal. If there are any cracks or holes in the room, such as those around pipes entering a bathroom, fill them with modeling clay or other similar material.
   - Do not use any major appliances located in your shelter-in-place such as the furnace, oven/range, clothes dryer or washing machine.
   - Remain in the room, listening to emergency broadcasts on the radio, until authorities advise you to leave your shelter.
   - If authorities warn of the possibility of an outdoor explosion, close all drapes, curtains, and shades in the room. Stay away from windows to prevent injury from breaking glass.
   - When authorities advise people in your area to leave their shelters, open all doors and windows and turn on air conditioning and ventilation systems. These measures will flush out any chemicals that infiltrated into the building.
   - See the "Shelter" chapter for more information.
8. Schools and other public buildings may institute procedures to shelter in place. If there is a hazardous materials incident and your children are at school, you will probably not be permitted to drive to the school to pick up your children. Even if you go to the school, the doors will probably be locked to keep your children safe. Follow the directions of your local emergency officials.
9. If you cannot escape from the vicinity of the release, avoid contact with spilled liquids, airborne mists or condensed solid chemical deposits. Keep your body fully covered to provide some protection. Wear gloves, socks, shoes, pants and long sleeved shirts.
10. Do not eat or drink food or water that may have been contaminated.
11. If indoors, fill the bathtub and large containers with water for drinking, cooking, and dishwashing. (NOTE: before using the bathtub or other containers to hold potable water, sterilize them with a diluted bleach solution — one part bleach to ten parts water). Be prepared to turn off the main water intake valve in case authorities advise you to do so.

What to do after an incident

1. Do not return home until local authorities say it is safe.
2. Upon returning home, open windows, vents and turn on fans to provide ventilation.
3. A person or item that has been exposed to a hazardous chemical may be contaminated and could contaminate other people or items. If you have come in contact with or have been exposed to hazardous chemicals, you should:
   - Follow decontamination instructions from local authorities. (Depending on the chemical, you may be advised to take a thorough shower, or you may be advised to stay away from water and follow another procedure.)
   - Seek medical treatment for unusual symptoms as soon as possible.
   - If medical help is not immediately available and you think you might be contaminated, remove all of your clothing and shower thoroughly (unless local authorities say the chemical is water reactive and advise you to do otherwise). Change into fresh, loose clothing and seek medical help as soon as possible.
   - Place exposed clothing and shoes in tightly sealed containers. Do not allow them to contact other materials. Call local authorities to find out about proper disposal.
   - Advise everyone who comes in contact with you that you may have been exposed to a toxic substance.
4. Find out from local authorities how to clean up your land and property.
5. Report any lingering vapors or other hazards to your local emergency services office.
6. See the "Recovering from Disaster" and "Shelter" chapters for more information.

If you spill a chemical, clean it up immediately with rags. Be careful to protect your eyes with eyeglasses or goggles and your skin with gloves.

Household Chemical Emergencies

Nearly every household uses products containing hazardous materials. Although the risk of a chemical accident is slight, knowing how to handle these products and how to react during an emergency can reduce the risk of injury.

How to prepare for household chemical emergencies

1. Contact agencies with expertise on hazardous household materials, such as your local public health department, fire department, or the Environmental Protection Agency, for information about potentially dangerous household products.
2. It is important that you always use, store, and dispose of hazardous materials safely:
   - Follow the instructions for storage, use, and disposal provided on the label.
   - Use and store products containing hazardous substances carefully to prevent accidents at home. Never store hazardous products in food containers. Keep products containing hazardous materials in their original containers and never remove the labels. Corroding containers, however,

should be repackaged and clearly labeled. This will prevent accidental ingestion and also can help protect sanitation workers.

- Never mix household hazardous chemicals or waste with other products. Incompatibles, such as chlorine bleach and ammonia, may react, ignite, or explode; contaminated household hazardous waste may become unrecyclable.
- Take household hazardous waste to a local collection program. Check with your county, or state environmental or solid waste agency to learn if there is a household hazardous waste collection program in your area.

3. Never smoke while using household chemicals. Do not use hair spray, cleaning solutions, paint products, or pesticides near an open flame, 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.

4. If you spill a chemical, clean it up immediately with rags. Be careful to protect your eyes and skin (wear gloves and eye protection). Allow the fumes in the rags to evaporate outdoors, then dispose of the rags by wrapping them in a newspaper and placing them in a sealed plastic bag in your trash can.

5. Buy only as much of a chemical as you think you will use. Leftover material can be shared with neighbors or donated to a business, charity, or government agency. Excess pesticide could be offered to a greenhouse or garden center, for example, and theater groups often need surplus paint. Some communities have organized waste exchanges where household hazardous chemicals and waste can be swapped or given away. Storing hazardous chemicals increases risk of chemical emergencies.

6. 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 it.

7. Learn to detect hazardous materials. Many hazardous materials do not have a taste or an odor, and some can be detected because they cause physical reactions such as watering eyes or nausea. Other hazardous materials exist beneath the ground and can be recognized by an oil or foam-like appearance.

8. Learn to recognize the symptoms of toxic poisoning:
   - Difficulty 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

9. 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. The national poison control number is 1-800-222-1222.

10. Keep Syrup of Ipecac and Activated Charcoal on hand in case of accidental poisoning. DO NOT administer these antidotes until a poison control center or another medical professional advises you to do so.

What to do during a household chemical emergency

1. If your child should eat or drink a non-food substance, find any containers immediately and take them with you to the phone. Medical professionals may need specific information from the container to give you the best emergency advice.
2. Call the poison control center, emergency medical services (EMS), 911, hospital emergency room, county health department, fire department or your local pharmacy. They will give you emergency advice while you wait for emergency services to arrive. You should have such numbers on hand for easy access and use.
3. Follow the emergency operator or dispatcher's instructions carefully. The first aid advice found on containers may not be appropriate. Do not give anything by mouth until medical professionals have advised you.
4. Take immediate action if the chemical gets into the eyes. Delaying first aid can greatly increase the likelihood of injury. Flush the eye with clear, 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, and then seek medical attention.
5. Get out of the residence immediately if there is danger of a fire or explosion. Do not waste time collecting items or calling the fire department when you are in danger.
6. 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.
7. Stay upwind and away from the residence to avoid breathing toxic fumes.
8. Wash hands, arms, or other body parts that may have been exposed to the chemical. Chemicals may continue to irritate the skin until they are washed off.
9. Discard clothing that may have been contaminated. Some chemicals may not wash out completely. Discarding clothes will prevent potential future exposure.
10. Administer first aid treatment to victims of chemical burns.
    - Call 911 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.

Nuclear Power Plants

Nuclear power plants operate in most states in the country and produce about 20 percent of the nation's power. Nearly three million Americans live within 10 miles of an operating nuclear power plant.

Although the construction and operation of these facilities are closely monitored and regulated by the Nuclear Regulatory Commission (NRC), accidents at these plants are possible. An accident could result in dangerous levels of radiation that could affect the health and safety of the public living near the nuclear power plant.

Local and state governments, federal agencies and the electric utilities have emergency response plans in the event of a nuclear power plant incident. The plans define two "emergency planning zones." One covers an area within a ten-mile radius of the plant where it is possible that people could be harmed by direct radiation exposure. The second zone covers a broader area, usually up to a 50-mile radius from the plant, where radioactive materials could contaminate water supplies, food crops and livestock.

Understanding radiation

Radioactive materials are composed of atoms that are unstable. An unstable atom gives off its excess energy until it becomes stable. The energy emitted is radiation.

Each of us is exposed to radiation daily from natural sources, including the sun and earth. Small traces of radiation are present in food and water. Radiation also is released from man-made sources such as x-ray machines, television sets and microwave ovens. Nuclear power plants use the heat generated from nuclear fission in a contained environment to convert water to steam, which powers generators to produce electricity.

Radiation has a cumulative effect. The longer a person is exposed to radiation, the greater the effect. A high exposure to radiation can cause serious illness or death. The potential danger from an accident at a nuclear power plant is exposure to radiation. This exposure could come from the release of radioactive material from the plant into the environment, usually characterized by a plume (cloud-like) formation of radioactive gases and particles. The area the radioactive release may affect is determined by the amount released from the plant, wind direction and speed, and weather conditions. The major hazards to people in the vicinity of the plume are radiation exposure to the body from the cloud and particles deposited on the ground, inhalation of radioactive materials, and ingestion of radioactive materials.

If an accident at a nuclear power plant were to release radiation in your area,

local authorities would activate warning sirens or another approved alerting method. They would also instruct you through the Emergency Alert System (EAS) on local television and radio stations on how to protect yourself.

The three ways to minimize radiation exposure are: distance, shielding and time:

- **Distance.** The more distance between you and the source of the radiation the better. In a serious nuclear power plant accident, local authorities will call for an evacuation to increase the distance between you and the radiation.
- **Shielding.** Like distance, the more heavy, dense material between you and the source of the radiation the better. This is why local authorities could advise you to remain indoors if an accident occurs at a nearby nuclear power plant. In some cases, the walls in your home would be sufficient shielding to protect you.
- **Time.** Most radioactivity loses its strength fairly quickly. In a nuclear power plant accident, local authorities will monitor any release of radiation and determine when the threat has passed.

The three ways to minimize radiation exposure are distance, shielding and time.

What to do before a nuclear power plant emergency

1. Know the terms used to describe a nuclear emergency:
   - **Notification of Unusual Event**—A small problem has occurred at the plant. No radiation leak is expected. Federal, state and county officials will be told right away. No action on your part will be necessary.
   - **Alert**—A small problem has occurred, and small amounts of radiation could leak inside the plant. This will not affect you. You should not have to do anything.
   - **Site Area Emergency**—A more serious problem. Small amounts of radiation could leak from the plant. If necessary, state and county officials will act to assure public safety. Area sirens may be sounded. Listen to your radio or television for safety information.
   - **General Emergency**—The most serious problem. Radiation could leak outside the plant and off the plant site. The sirens will sound. Tune to your local radio or television station for reports. State and county officials will act to protect the public. Be prepared to follow instructions promptly.

2. Learn your community's warning system. Nuclear power plants are required to install sirens and other warning systems (flash warning lights) to cover a ten-mile area around the plant.
   - Find out when the warning systems will be tested next.
   - When tested in your area, determine whether you can hear and/or see sirens and flash warning lights from your home.

3. Obtain public emergency information materials from the power company that operates your local nuclear power plant or your local emergency services office. If you live within 10 miles of the power plant, you should receive these materials yearly from the power com-

pany or your state or local government.

4. Learn the emergency plans for schools, day care centers, nursing homes and other places where members of your household frequent. Learn where people would go in case of evacuation. Stay tuned to your local radio and television stations.

5. Be prepared to evacuate.
   - Prepare a disaster supplies kit (see the "Emergency Planning and Disaster Supplies" chapter).
   - Consider your transportation options. If you do not own or drive a car, ask your local emergency manager about plans for people without private vehicles. (See the "Evacuation" chapter for important details.)

Learn your community's warning system and the emergency plans for schools, day care centers, nursing homes and other places your household frequents.

What to do during a nuclear power plant emergency

1. Listen to the warning. Not all incidents result in the release of radiation. The incident could be contained inside the plant and pose no danger to the public.

2. Stay tuned to local radio or television. Local authorities will provide specific information and instructions.
   - The advice given will depend on the nature of the emergency, how quickly it is evolving and how much radiation, if any, is likely to be released.
   - Local instructions should take precedence over any advice given in this handbook.
   - Review the public information materials you received from the power company or government officials.

3. Evacuate if you are advised to do so.
   - Close and lock doors and windows.
   - Keep car windows and vents closed; use re-circulating air.
   - Listen to radio for evacuation routes and other instructions.
   - See the "Evacuation" chapter for important details.

4. If you are not advised to evacuate, remain indoors.
   - Close doors and windows.
   - Turn off the air conditioner, ventilation fans, furnace and other air intakes.
   - Go to a basement or other underground area if possible.
   - Keep a battery-powered radio with you at all times.

5. Shelter livestock and give them stored feed, if time permits.

6. Do not use the telephone unless absolutely necessary. Lines will be needed for emergency calls.

7. If you suspect exposure, take a thorough shower.
   - Change clothes and shoes.
   - Put exposed clothing in a plastic bag.
   - Seal the bag and place it out of the way.

8. Put food in covered containers or in the refrigerator. Food not previously covered should be washed before being put in containers.

What to do after a nuclear power plant emergency

1. If you evacuated, do not return home until local authorities say it is safe.
2. If you were advised to stay in your home, do not go outside until local authorities indicate it is safe.
3. Seek medical treatment for any unusual symptoms, like nausea, that may be related to radiation exposure.
4. See the "Shelter" and "Recovering from Disaster" chapters for more information.

National Security Emergencies

In addition to the natural and technological hazards described in this publication, Americans face threats posed by hostile governments or extremist groups. These threats to national security include acts of terrorism and acts of war.

The following is general information about national security emergencies. For more information about how to prepare for them, including volunteering in a Citizen Corps program, see the "For More Information" chapter at the end of this guide.

Terrorism

Terrorism is the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom. Terrorists often use threats to create fear among the public, to try to convince citizens that their government is powerless to prevent terrorism, and to get immediate publicity for their causes.

Acts of terrorism range from threats of terrorism, assassinations, kidnappings, hijackings, bomb scares and bombings, cyber attacks (computer-based), to the use of chemical, biological and nuclear weapons.

High-risk targets include military and civilian government facilities, international airports, large cities and high-profile landmarks. Terrorists might also target large public gatherings, water and food supplies, utilities, and corporate centers. Further, they are capable of spreading fear by sending explosives or chemical and biological agents through the mail.

In the immediate area of a terrorist event, you would need to rely on police, fire and other officials for instructions. However, you can prepare in much the same way you would prepare for other crisis events.

Preparing for terrorism

1. Wherever you are, be aware of your surroundings. The very nature of terrorism suggests there may be little or no warning.
2. Take precautions when traveling. Be aware of conspicuous or unusual behavior. Do not accept packages from strangers. Do not leave luggage unattended. Unusual behavior, suspicious or unattended packages and strange devices should be promptly reported to the police or security personnel.
3. Do not be afraid to move or leave if you feel uncomfortable or if something does not seem right.

4. Learn where emergency exits are located in buildings you frequent. Notice where exits are when you enter unfamiliar buildings. Plan how to get out of a building, subway or congested public area or traffic. Note where staircases are located. Notice heavy or breakable objects that could move, fall or break in an explosion.

5. Assemble a disaster supplies kit at home and learn first aid. Separate the supplies you would take if you had to evacuate quickly, and put them in a backpack or container, ready to go.

6. Be familiar with different types of fire extinguishers and how to locate them. Know the location and availability of hard hats in buildings in which you spend a lot of time.

Protection against cyber attacks

Cyber attacks target computer or telecommunication networks of critical infrastructures such as power systems, traffic control systems, or financial systems. Cyber attacks target information technologies (IT) in three different ways. First, is a direct attack against an information system "through the wires" alone (hacking). Second, the attack can be a physical assault against a critical IT element. Third, the attack can be from the inside as a result of compromising a trusted party with access to the system.

1. Be prepared to do without services you normally depend on that could be disrupted—electricity, telephone, natural gas, gasoline pumps, cash registers, ATM machines, and internet transactions.

2. Be prepared to respond to official instructions if a cyber attack triggers other hazards, for example, general evacuation, evacuation to shelter, or shelter-in-place, because of hazardous materials releases, nuclear power plant incident, dam or flood control system failures.

Preparing for a building explosion

Explosions can collapse buildings and cause fires. People who live or work in a multi-level building can do the following:

1. Review emergency evacuation procedures. Know where emergency exits are located.

2. Keep fire extinguishers in working order. Know where they are located, and learn how to use them.

3. Learn first aid. Contact the local chapter of the American Red Cross for information and training.

4. Building owners should keep the following items in a designated place on each floor of the building.
   - Portable, battery-operated radio and extra batteries
   - Several flashlights and extra batteries
   - First aid kit and manual
   - Several hard hats
   - Fluorescent tape to rope off dangerous areas

Bomb threats

If you receive a bomb threat, get as much information from the caller as possible. Keep the caller on the line and record everything that is said. Then notify the police and the building management.

If you are notified of a bomb threat, do not touch any suspicious packages. Clear the area around suspicious packages and notify the police immediately. In evacuating a building, don't stand in front of windows,

glass doors or other potentially hazardous areas. Do not block sidewalk or streets to be used by emergency officials or others still exiting the building.

Suspicious parcels and letters

Be wary of suspicious packages and letters. They can contain explosives, chemical or biological agents. Be particularly cautious at your place of employment.

Some typical characteristics postal inspectors have detected over the years, which ought to trigger suspicion, include parcels that—

- Are unexpected or from someone unfamiliar to you.
- Have no return address, or have one that can't be verified as legitimate.
- Are marked with restrictive endorsements, such as "Personal," "Confidential" or "Do not x-ray."
- Have protruding wires or aluminum foil, strange odors or stains.
- Show a city or state in the postmark that doesn't match the return address.
- Are of unusual weight, given their size, or are lopsided or oddly shaped.
- Are marked with any threatening language.
- Have inappropriate or unusual labeling.
- Have excessive postage or excessive packaging material such as masking tape and string.
- Have misspellings of common words.
- Are addressed to someone no longer with your organization or are otherwise outdated.
- Have incorrect titles or title without a name.
- Are not addressed to a specific person.
- Have handwritten or poorly typed addresses.

In the immediate area of a terrorist event, leave quickly and orderly. Listen to police, fire, and other officials for instructions.

With suspicious envelopes and packages other than those that might contain explosives, take these additional steps against possible biological and chemical agents.

- Refrain from eating or drinking in a designated mail handling area.
- Place suspicious envelopes or packages in a plastic bag or some other type of container to prevent leakage of contents. Never sniff or smell suspect mail.
- If you do not have a container, then cover the envelope or package with anything available (e.g., clothing, paper, trash can, etc.) and do not remove the cover.
- Leave the room and close the door, or section off the area to prevent others from entering.
- Wash your hands with soap and water to prevent spreading any powder to your face.
- If you are at work, report the incident to your building security official or an available supervisor, who should notify police and other authorities without delay.
- List all people who were in the room or area when this suspicious letter or package was recognized. Give a copy of this list to both the local public health authorities and law enforcement officials for follow-up investigations and advice.
- If you are at home, report the incident to local police.

What to do if there is an explosion

Leave the building as quickly as possible. Do not stop to retrieve personal possessions or make phone calls. If things are falling around you, get under a sturdy table or desk until they stop falling. Then leave quickly, watching for obviously weakened floors and stairways. As you exit, be expecially watchful of falling debris.

1. If there is a fire:
   - Stay low to the floor and exit the building as quickly as possible.
   - Cover your nose and mouth with a wet cloth.
   - When approaching a closed door, use the back of your hand to feel the lower, middle and upper parts of the door. **Never** use the palm of your hand or fingers to test for heat: burning those areas could impair your ability to escape a fire (i.e., ladders and crawling).
     - If the door is NOT hot, open slowly and ensure fire and/or smoke is not blocking your escape route. If your escape route is blocked, shut the door immediately and use an alternate escape route, such as a window. If clear, leave immediately through the door. Be prepared to crawl. Smoke and heat rise. The air is clearer and cooler near the floor.
     - If the door is hot, do not open it. Escape through a window. If you cannot escape, hang a white or light-colored sheet outside the window, alerting fire fighters to your presence.
   - Heavy smoke and poisonous gases collect first along the ceiling. Stay below the smoke at all times.
2. If you are trapped in debris:
   - Do not light a match.
   - Do not move about or kick up dust. Cover your mouth with a handkerchief or clothing.
   - Rhythmically tap on a pipe or wall so that rescuers can hear where you are. Use a whistle if one is available. Shout only as a last resort when you hear sounds and think someone will hear you—shouting can cause a person to inhale dangerous amounts of dust.

Chemical and Biological Weapons

In case of a chemical or biological weapon attack near you, authorities will instruct you on the best course of action. This may be to evacuate the area immediately, to seek shelter at a designated location, or to take immediate shelter where you are and seal the premises. The best way to protect yourself is to take emergency preparedness measures ahead of time and to get medical attention as soon as possible, if needed.

Chemical

Chemical warfare agents are poisonous vapors, aerosols, liquids or solids that have toxic effects on people, animals or plants. They can be released by bombs, sprayed from aircraft, boats, or vehicles, or used as a liquid to create a hazard to people and the environment. Some chemical agents may be odorless and tasteless. They can have an immediate effect (a few seconds to a few minutes) or a delayed effect (several hours to several days). While potentially lethal, chemical agents are difficult to deliver in lethal concentrations.

Outdoors, the agents often dissipate rapidly. Chemical agents are also difficult to produce.

There are six types of agents:

- Lung-damaging (pulmonary) agents such as phosgene,
- Cyanide,
- Vesicants or blister agents such as mustard,
- Nerve agents such as GA (tabun), GB (sarin), GD (soman), GF, and VX,
- Incapacitating agents such as BZ, and
- Riot-control agents (similar to MACE).

Biological

Biological agents are organisms or toxins that can kill or incapacitate people, livestock and crops. The three basic groups of biological agents which would likely be used as weapons are bacteria, viruses, and toxins.

1. *Bacteria.* Bacteria are small free-living organisms that reproduce by simple division and are easy to grow. The diseases they produce often respond to treatment with antibiotics.

2. *Viruses.* Viruses are organisms which require living cells in which to reproduce and are intimately dependent upon the body they infect. Viruses produce diseases which generally do not respond to antibiotics. However, antiviral drugs are sometimes effective.

3. *Toxins.* Toxins are poisonous substances found in, and extracted from, living plants, animals, or microorganisms; some toxins can be produced or altered by chemical means. Some toxins can be treated with specific antitoxins and selected drugs.

Most biological agents are difficult to grow and maintain. Many break down quickly when exposed to sunlight and other environmental factors, while others such as anthrax spores are very long lived. They can be dispersed by spraying them in the air, or infecting animals which carry the disease to humans as well through food and water contamination.

- **Aerosols**—Biological agents are dispersed into the air, forming a fine mist that may drift for miles. Inhaling the agent may cause disease in people or animals.

- **Animals**—Some diseases are spread by insects and animals, such as fleas, mice, flies, and mosquitoes. Deliberately spreading diseases through livestock is also referred to as agroterrorism.

- **Food and water contamination**—Some pathogenic organisms and toxins may persist in food and water supplies. Most microbes can be killed, and toxins deactivated, by cooking food and boiling water.

Be aware of your surroundings. The very nature of terrorism suggests that there may be little or no warning.

Anthrax spores formulated as a white powder were mailed to individuals in the government and media in the fall of 2001. Postal sorting machines and the opening of letters dispersed the spores as aerosols. Several deaths resulted. The effect was to disrupt mail service and to cause a widespread fear of handling delivered mail among the public.

Person-to-person spread of a few infectious agents is also possible. Humans have been the source of infection for smallpox, plague, and the Lassa viruses.

What to do to prepare for a chemical or biological attack

- Talk to your doctor to ensure all required or suggested immunizations are up to date.
- Assemble a disaster supplies kit (see the "Emergency Planning and Disaster Supplies" chapter for more information) and be sure to include:
- Battery-powered commercial radio with extra batteries.
- Non-perishable food and drinking water.
- Roll of duct tape and scissors.
- Plastic for doors, windows and vents for the room in which you will shelter in place—this should be an internal room where you can block out air that may contain hazardous chemical or biological agents. To save critical time during an emergency, sheeting should be pre-measured and cut for each opening.
- First aid kit.
- Sanitation supplies including soap, water and bleach.

The best protection against a chemical or biological attack would come from being prepared and getting quick medical attention.

What to do during a chemical or biological attack

1. Listen to your radio for instructions from authorities such as whether to remain inside or to evacuate.
2. If you are instructed to remain in your home, the building where you are, or other shelter during a chemical or biological attack:
   - Turn off all ventilation, including furnaces, air conditioners, vents and fans.
   - Seek shelter in an internal room, preferably one without windows. Seal the room with duct tape and plastic sheeting. Ten square feet of floor space per person will provide sufficient air to prevent carbon dioxide build-up for up to five hours. (See "Shelter" chapter.)
   - When selecting a shelter-in-place, avoid the furnace or utility room.
   - Do not use any major appliances located in your shelter-in-place such as the furnace, oven/range, clothes dryer or washing machine.
   - Remain in protected areas where toxic vapors are reduced or eliminated, and be sure to take your battery-operated radio with you.
3. If you are caught in an unprotected area, you should:
   - Attempt to get up-wind of the contaminated area.
   - Attempt to find shelter inside a building as quickly as possible.
   - Listen to your radio for official instructions.
4. If you are in a vehicle and are unable to go inside a building, stay in the verhicle, roll up the windows, turn off the engine and shut all vents.

What to do after a chemical attack

Immediate symptoms of exposure to chemical agents may include blurred vision, eye irritation, difficulty breathing and nausea. A person affected by a chemical or biological agent requires immediate attention by professional medical personnel. If medical help is not immediately available, decontaminate yourself and assist in decontaminating others. Decontamination is needed

within minutes of exposure to minimize health consequences. Use extreme caution when helping others who have been exposed to chemical agents. (However, you should not leave the safety of a shelter to go outdoors to help others until authorities announce it is safe to do so.)

To decontaminate, follow these procedures:

1. Remove items in contact with the body, including jewelry (rings, watches, etc) and other items such as hair clips. Contaminated clothing normally removed over the head should be cut off to avoid contact with the eyes, nose, and mouth. Put into a plastic bag if possible. Decontaminate hands using soap and water. Remove eyeglasses or contact lenses. Put glasses in a pan of household bleach to decontaminate.
2. Remove all items in contact with the body.
3. Flush eyes with lots of water.
4. Gently wash face and hair with soap and water; then thoroughly rinse with water.
5. Decontaminate other body areas likely to have been contaminated. Blot (do not swab or scrape) with a cloth soaked in soapy water and rinse with clear water.
6. Change into uncontaminated clothes. Clothing stored in drawers or closets is likely to be uncontaminated.
7. If possible, proceed to a medical facility for screening.

What to do after a biological attack

In many biological attacks, people will not know they have been exposed to an agent. In such situations, the first evidence of an attack may be when you notice symptoms of the disease caused by an agent exposure, and you should seek immediate medical attention for treatment.

In some situations, like the anthrax letters sent in 2001, people may be alerted to a potential exposure. If this is the case, pay close attention to all official warnings and instructions on how to proceed. The delivery of medical services for a biological event may be handled differently to respond to increased demand. Again, it will be important for you to pay attention to official instructions via radio, television, and emergency alert systems.

If your skin or clothing comes in contact with a visible, potentially infectious substance, you should remove and bag your clothes and personal items and wash yourself with warm soapy water immediately. Put on clean clothes and seek medical assistance.

For more information, visit the website for the Centers for Disease Control and Prevention, www.bt.cdc.gov.

Nuclear and Radiological Attack

Nuclear explosions can cause deadly effects—blinding light, intense heat (thermal radiation), initial nuclear radiation, blast, fires started by the heat pulse, and secondary fires caused by the destruction. Surface level explosions also produce radioactive particles called fallout that can be carried by wind for hundreds of miles.

Terrorist use of a radiological dispersion device (RDD)—often called ”dirty nuke” or “dirty bomb”—is considered far more likely than use of a nuclear device. These radiological weapons are a combination of conventional explosives and radioactive material designed to scatter dangerous

and sub-lethal amounts of radio- active material over a general area. Such radiological weapons appeal to terrorists because they require very little technical knowledge to build and deploy compared to that of a nuclear device. Also, these radioactive materials, used widely in medicine, agriculture, industry and research, are much more readily available and easy to obtain compared to weapons grade uranium or plutonium.

Terrorist use of a nuclear device would probably be limited to a single smaller "suitcase" weapon. The strength of such a weapon would be in the range of the bombs used during World War II. The nature of the effects would be the same as a weapon delivered by an inter-continental missile, but the area and severity of the effects would be significantly more limited.

Most electronic equipment within 1,000 miles of a high-altitude nuclear detonation could be damaged by EMP.

There is no way of knowing how much warning time there would be before an attack by a terrorist using a nuclear or radiological weapon. A surprise attack remains a possibility.

The danger of a massive strategic nuclear attack on the United States involving many weapons receded with the end of the Cold War. However, some terrorists have been supported by nations that have nuclear weapons programs.

If there were threat of an attack from a hostile nation, people living near potential targets could be advised to evacuate or they could decide on their own to evacuate to an area not considered a likely target. Protection from radioactive fallout would require taking shelter in an underground area, or in the middle of a large building.

In general, potential targets include:

- Strategic missile sites and military bases.
- Centers of government such as Washington, D.C., and state capitals.
- Important transportation and communication centers.
- Manufacturing, industrial, technology and financial centers.
- Petroleum refineries, electrical power plants and chemical plants.
- Major ports and airfields.

Taking shelter during a nuclear attack is absolutely necessary. There are two kinds of shelters—blast and fallout.

Blast shelters offer some protection against blast pressure, initial radiation, heat and fire, but even a blast shelter could not withstand a direct hit from a nuclear detonation.

Fallout shelters do not need to be specially constructed for that purpose. They can be any protected space, provided that the walls and roof are thick and dense enough to absorb the radiation given off by fallout particles. The three protective factors of a fallout shelter are *shielding*, *distance*, and *time*.

- *Shielding.* The more heavy, dense materials—thick walls, concrete, bricks, books and earth—between you and the fallout particles, the better.
- *Distance.* The more distance between you and the fallout particles, the better. An underground area, such as a home or office building basement, offers more protection than the first floor of a building. A floor near the middle of a high-rise may be better, depending on what is nearby at that level on which significant fallout particles would collect. Flat roofs collect fallout particles so the top floor is not a good choice, nor is a floor adjacent to a neighboring flat roof.

- *Time.* Fallout radiation loses its intensity fairly rapidly. In time, you will be able to leave the fallout shelter. Radioactive fallout poses the greatest threat to people during the first two weeks, by which time it has declined to about 1% of its initial radiation level.

Remember that any protection, however temporary, is better than none at all, and the more shielding, distance and time you can take advantage of, the better.

Electromagnetic pulse

In addition to other effects, a nuclear weapon detonated in or above the earth's atmosphere can create an electromagnetic pulse (EMP), a high-density electrical field. EMP acts like a stroke of lightning but is stronger, faster and briefer. EMP can seriously damage electronic devices connected to power sources or antennas. This include communication systems, computers, electrical appliances, and automobile or aircraft ignition systems. The damage could range from a minor interruption to actual burnout of components. Most electronic equipment within 1,000 miles of a high-altitude nuclear detonation could be affected. Battery powered radios with short antennas generally would not be affected.

Although EMP is unlikely to harm most people, it could harm those with pacemakers or other implanted electronic devices.

What to do before a nuclear or radiological attack

1. Learn the warning signals and all sources of warning used in your community. Make sure you know what the signals are, what they mean, how they will be used, and what you should do if you hear them.
2. Assemble and maintain a disaster supplies kit with food, water, medications, fuel and personal items adequate for up to 2 weeks—the more the better. (See the "Emergency Planning and Disaster Supplies" chapter for more information).
3. Find out what public buildings in your community may have been designated as fallout shelters. It may have been years ago, but start there, and learn which buildings are still in use and could be designated as shelters again.
   - Call your local emergency management office.
   - Look for yellow and black fallout shelter signs on public buildings. Note: With the end of the Cold War, many of the signs have been removed from the buildings previously designated.
   - If no noticeable or official designations have been made, make your own list of potential shelters near your home, workplace and school: basements, or the windowless center area of middle floors in high-rise buildings, as well as subways and tunnels.
   - Give your household clear instructions about where fallout shelters are located and what actions to take in case of attack.
4. If you live in an apartment building or high-rise, talk to the manager about the safest place in the building for sheltering, and about providing for building occupants until it is safe to go out.
5. There are few public shelters in many suburban and rural areas. If you are considering building a fallout shelter at home, keep the following in mind.
   - A basement, or any underground area, is the best place to shelter from

fallout. Often, few major changes are needed, especially if the structure has two or more stories and its basement—or one corner of it—is below ground.

- Fallout shelters can be used for storage during non-emergency periods, but only store things there that can be very quickly removed. (When they are removed, dense, heavy items may be used to add to the shielding.)

5. There are few public shelters in many suburban and rural areas. If you are considering building a fallout shelter at home, keep the following in mind.
   - See the "Tornadoes" section in the "Thunderstorms" chapter for information on the "Wind Safe Room," which could be used as shelter in the event of a nuclear detonation or for fallout protection, especially in a home without a basement.
   - All the items you will need for your stay need not be stocked inside the shelter itself but can be stored elsewhere, as long as you can move them quickly to the shelter.
6. Learn about your community's evacuation plans. Such plans may include evacuation routes, relocation sites, how the public will be notified and transportation options for people who do not own cars and those who have special needs. See the "Evacuation" chapter for more information.
7. Acquire other emergency preparedness booklets that you may need. See the "For More Information" chapter at the end of this guide.

What to do during a nuclear or radiological attack

1. Do not look at the flash or fireball—it can blind you.
2. If you hear an attack warning:
   - Take cover as quickly as you can, BELOW GROUND IF POSSIBLE, and stay there unless instructed to do otherwise.
   - If you are caught outside, unable to get inside immediately, take cover behind anything that might offer protection. Lie flat on the ground and cover your head.
   - If the explosion is some distance away, it could take 30 seconds or more for the blast wave to hit.
3. Protect yourself from radioactive fallout. If you are close enough to see the brilliant flash of a nuclear explosion, the fallout will arrive in about 20 minutes. Take shelter, even if you are many miles from ground zero—radioactive fallout can be carried by the winds for hundreds of miles. Remember the three protective factors: *shielding, distance* and *time.*
4. Keep a battery-powered radio with you, and listen for official information. Follow the instructions given. Local instructions should always take precedence: officials on the ground know the local situation best.

What to do after a nuclear or radiological attack

In a public or home shelter:

1. Do not leave the shelter until officials say it is safe. Follow their instructions when leaving.
2. If in a fallout shelter, stay in your shelter until local authorities tell you it is permissible or advisable to leave. The length of your stay can range from a day or two to four weeks.
   - Contamination from a radiological dispersion device could affect a wide area, depending on the amount of

conventional explosives used, the quantity of radioactive material and atmospheric conditions.

- A "suitcase" terrorist nuclear device detonated at or near ground level would produce heavy fallout from the dirt and debris sucked up into the mushroom cloud.
- A missile-delivered nuclear weapon from a hostile nation would probably cause an explosion many times more powerful than a suitcase bomb, and provide a greater cloud of radioactive fallout.
- The decay rate of the radioactive fallout would be the same, making it necessary for those in the areas with highest radiation levels to remain in shelter for up to a month.
- The heaviest fallout would be limited to the area at or downwind from the explosion, and 80% of the fallout would occur during the first 24 hours.
- Because of these facts and the very limited number of weapons terrorists could detonate, most of the country would not be affected by fallout.
- People in most of the areas that would be affected could be allowed to come out of shelter and, if necessary, evacuate to unaffected areas within a few days.

Learn how to build a temporary fallout shelter to protect yourself from radioactive fallout even if you do not live near a potential nuclear target.

3. Although it may be difficult, make every effort to maintain sanitary conditions in your shelter space.
4. Water and food may be scarce. Use them prudently but do not impose severe rationing, especially for children, the ill or elderly.
5. Cooperate with shelter managers. Living with many people in confined space can be difficult and unpleasant.

Returning to your home

1. Keep listening to the radio for news about what to do, where to go, and places to avoid.
2. If your home was within the range of a bomb's shock wave, or you live in a high-rise or other apartment building that experienced a non-nuclear explosion, check first for any sign of collapse or damage, such as:
   - toppling chimneys, falling bricks, collapsing walls, plaster falling from ceilings.
   - fallen light fixtures, pictures and mirrors.
   - broken glass from windows.
   - overturned bookcases, wall units or other fixtures.
   - fires from broken chimneys.
   - ruptured gas and electric lines.
3. Immediately clean up spilled medicines, drugs, flammable liquids, and other potentially hazardous materials.
4. Listen to your radio for instructions and information about community services.
5. Monitor the radio and your television for information on assistance that may be provided. Local, state and federal governments and other organizations will help meet emergency needs and help you recover from damage and losses.
6. The danger may be aggravated by broken water mains and fallen power lines.
7. If you turned gas, water and electricity off at the main valves and switch before you went to shelter:

- Do not turn the gas back on. The gas company will turn it back on for you or you will receive other instructions.
- Turn the water back on at the main valve only after you know the water system is working and water is not contaminated.
- Do not turn the gas back on. The gas company will turn it back on for you or you will receive other instructions.
- Turn the water back on at the main valve only after you know the water system is working and water is not contaminated.
- Turn electricity back on at the main switch only after you know the wiring is undamaged in your home and the community electrical system is functioning.
- Check to see that sewage lines are intact before using sanitary facilities.

8. Stay away from damaged areas.
9. Stay away from areas marked "radiation hazard" or "HAZMAT."

For more information relevant to terrorism consult the following chapters:

- The "Earthquakes" chapter for information about protecting yourself when a building is shaking or unsafe and the Fire chapter for tips on fire safety.
- The "Hazardous Materials Incidents" chapter for information about sealing a home.
- The "Emergency Planning and Disaster Supplies" chapter for information about preparing a disaster supplies kit.
- The "Shelter" chapter for measures regarding water purification.
- The "Evacuation" chapter for information about evacuation procedures.
- The "Recovering from Disaster" chapter for information about crisis counseling.

Homeland Security Advisory System

The Homeland Security Advisory System was designed to provide a national framework and comprehensive means to disseminate information regarding the risk of terrorist acts to federal, state, and local authorities and to the American people. This system provides warnings in the form of a set of graduated "threat conditions" that increase as the risk of the threat increases. At each threat condition, government entities and the private sector, including businesses and schools, would implement a corresponding set of "protective measures" to further reduce vulnerability or increase response capability during a period of heightened alert.

Although the Homeland Security Advisory System is binding on the executive branch, it is voluntary to other levels of government and the private sector. There are five threat conditions, each identified by a description and corresponding color.

The greater the risk of a terrorist attack, the higher the threat condition. Risk includes both the probability of an attack occurring and its potential gravity.

Threat conditions may be assigned for the entire nation, or they may be set for a particular geographic area or industrial sector. Assigned threat conditions will be reviewed at regular intervals to determine whether adjustments are warranted.

Threat Conditions and Associated Protective Measures

There is always a risk of a terrorist threat. Each threat condition assigns a level of alert appropriate to the increasing risk of terrorist attacks. Beneath each threat condition are some suggested protective measures that the government, the private sector, and the public can take, recognizing that the heads of federal departments and agencies are responsible for developing and implementing appropriate agency-specific protective measures:

Low Condition (Green). This condition is declared when there is a low risk of terrorist attacks. Government entities and the private sector, including businesses and schools, should consider the following protective measures:

- Refine and exercise prearranged protective measures;
- Ensure personnel receive proper training on the Homeland Security Advisory System and specific prearranged department or agency protective measures; and
- Institute a process to assure that all facilities and regulated sectors are regularly assessed for vulnerabilities to terrorist attacks, and all reasonable measures are taken to mitigate these vulnerabilities.

Members of the public can:

- Develop a household disaster plan and assemble a disaster supplies kit. (See "Emergency Planning and Disaster Supplies" chapter).

Guarded Condition (Blue). This condition is declared when there is a general risk of terrorist attacks. In addition to the measures taken in the previous threat condition, government entities and the private sector, including businesses and schools, should consider the following protective measures:

- Check communications with designated emergency response or command locations;
- Review and update emergency response procedures; and
- Provide the public with any information that would strengthen its ability to act appropriately.

Members of the public, in addition to the actions taken for the previous threat condition, can:

- Update their disaster supplies kit;
- Review their household disaster plan;
- Hold a household meeting to discuss what members would do and how they would communicate in the event of an incident;
- Develop a more detailed household communication plan;
- Apartment residents should discuss with building managers steps to be taken during an emergency; and
- People with special needs should discuss their emergency plans with friends, family or employers.

Elevated Condition (Yellow). An Elevated Condition is declared when there is a significant risk of terrorist attacks. In addition to the measures taken in the previous threat conditions, government entities and the private sector, including businesses and schools, should consider the following protective measures:

- Increase surveillance of critical locations;
- Coordinate emergency plans with nearby jurisdictions as appropriate;

- Assess whether the precise characteristics of the threat require the further refinement of prearranged protective measures; and
- Implement, as appropriate, contingency and emergency response plans.

Members of the public, in addition to the actions taken for the previous threat condition, can:

- Be observant of any suspicious activity and report it to authorities;
- Contact neighbors to discuss their plans and needs;
- Check with school officials to determine their plans for an emergency and procedures to reunite children with parents and caregivers; and
- Update the household communication plan.

High Condition (Orange). A High Condition is declared when there is a high risk of terrorist attacks. In addition to the measures taken in the previous threat conditions, federal departments and agencies will congovernment entities and the private sector, including businesses and schools, should consider the following protective measures:

- Coordinate necessary security efforts with federal, state, and local law enforcement agencies, National Guard or other security and armed forces;
- Take additional precautions at public events, possibly considering alternative venues or even cancellation;
- Prepare to execute contingency procedures, such as moving to an alternate site or dispersing the workforce; and
- Restrict access to a threatened facility to essential personnel only.

Members of the public, in addition to the actions taken for the previous threat conditions, can:

- Review preparedness measures (including evacuation and sheltering) for potential terrorist actions including chemical, biological, and radiological attacks;
- Avoid high profile or symbolic locations; and
- Exercise caution when traveling.

Severe Condition (Red). A Severe Condition reflects a severe risk of terrorist attacks. Under most circumstances, the protective measures for a Severe Condition are not intended to be sustained for substantial periods of time. In addition to the protective measures in the previous threat conditions, government entities and the private sector, including businesses and schools, should consider the following protective measures:

- Increase or redirect personnel to address critical emergency needs;
- Assign emergency response personnel and pre-position and mobilize specially trained teams or resources;
- Monitor, redirect, or constrain transportation systems; and
- Close public and government facilities not critical for continuity of essential operations, especially public safety.

Members of the public, in addition to the actions taken for the previous threat conditions, can:

- Avoid public gathering places such as sports arenas, holiday gatherings, or other high risk locations;
- Follow official instructions about restrictions to normal activities;
- Contact employer to determine status of work;
- Listen to the radio and TV for possible advisories or warnings; and
- Prepare to take protective actions such as sheltering-in-place or evacuation if instructed to do so by public officials.

For More Information

To obtain the following publications, visit FEMA online at **http://www.fema.gov/library** or by calling FEMA's Distribution Center at 1-800-480-2520. FEMA can be reached via mail at Federal Emergency Management Agency, P.O. Box 2012, Jessup, MD 20794-2012. Local emergency management offices are also good sources for emergency management publications.

***This is FEMA* (L-135)**. Provides an overview of FEMA.

***Are You Ready? A Guide to Citizen Preparedness* (H-34)**.

***Emergency Preparedness Checklist* (L-154)**. Provides a checklist of suggested disaster preparedness steps and activities. *Also available in Spanish.*

***Preparing for Emergencies: A Checklist, for People with Mobility Problems* (L-154M)**. Provides information specific to people with limited mobility including children, people with disabilities, and the elderly.

***Your Family Disaster Supplies Kit* (L-189)**. Provides a checklist of emergency supplies that should be kept in the home and contained in a Disaster Supplies Kit. *Also available in Spanish.*

***Your Family Disaster Plan* (L-191)**. Provides guidelines and instructions to help families develop a disaster plan. *Also available in Spanish.*

***Emergency Food and Water Supplies* (L-210)**. Explains how to choose food for an emergency kit, emergency cooking, water purification, where to locate emergency water, and how to store emergency food and water supplies in the home.

***Helping Children Cope with Disaster* (L-196)**. Provides information on how to prep children prior to disaster and how to lessen the emotional effects of disaster. *Also available in Spanish.*

***Disaster Preparedness Coloring Book* (FEMA-243)**. For ages 3-10. *Also available in Spanish.*

***Adventures of the Disaster Dudes* (FEMA-242)**. Includes a video and presenters guide for use by an adult with children ages 9-11.

***Before Disaster Strikes* (FEMA-291)**. Contains information on how to make sure you are financially prepared to deal with a natural disaster. *Also available in Spanish.*

***After Disaster Strikes* (FEMA-292)**. Contains information on how to recover financially from a natural disaster. *Also available in Spanish.*

***Emergency Management Guide for Business and Industry* (FEMA-141)**.

***When Disaster Strikes...* (L-217)**. Provides information on donations and volunteer organizations.

***The Adventures of Julia and Robbie: The Disaster Twins* (FEMA-344)**. A collection of disaster related stories. Includes information on preparedness and how to mitigate against disasters.

***FEMA for Kids* (L-229)**. Provides information about what FEMA (specifically FEMA.gov) has to offer children.

***After a Flood: The First Steps* (L-198)**. Information for homeowners on preparedness, safety and recovery from a flood.

***Community Shelter* (FEMA-361)**. Contains guidance for constructing mass shelters for public refuge in schools, hospitals and other places of assembly.

***Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding* (L-235)**. A brochure about obtaining information on how to protect your home from flooding.

***Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding* (FEMA-312)**. A detailed manual on how to protect your home from flooding.

***Taking Shelter from the Storm: Building a Safe Room Inside Your House* (L-233)**. This brochure provides details about obtaining information on how to build a Wind Safe Room to withstand tornado, hurricane and other high winds.

***Taking Shelter from the Storm: Building a Safe Room Inside Your House* (FEMA-320)**. This manual provides detailed information on how to build a Wind Safe Room to withstand tornado, hurricane and other high winds.

***Tornado Fact Sheet* (L-148)**. Provides safety tips for before, during and after a tornado.

***Against the Wind: Protecting Your Home from Hurricane and Wind Damage* (FEMA-247)**.

Avoiding Earthquake Damage: A Checklist for Homeowners. Safety tips for before, during and after an earthquake.

***Preparedness in High-Rise Buildings* (FEMA-76)**. Earthquake safety tips for high-rise dwellers.

***Learning to Live in Earthquake Country: Preparedness in Apartments and Mobile Homes* (L-143)**. Safety tips on earthquake preparation for residents of apartments and mobile homes.

***Family Earthquake Safety Home Hazard Hunt and Drill* (FEMA-113)**. How to identify home hazards; how to conduct earthquake drills.

***Wildfire: Are You Prepared?* (L-203)**. Wildfire safety tips, preparedness and mitigation techniques.

Citizen Corps

Citizen Corps provides opportunities for people across the country to participate in a range of measures to make their families, their homes, and their communities safer from the threats of crime, terrorism, and disasters of all kinds. Through public education, training opportunities, and volunteer programs, every American can do their part to be better prepared and better protected.

Citizen Corps is managed at the local level by Citizen Corps Councils, which bring together existing crime prevention, natural disaster preparedness, and public health response networks with the volunteer community and other groups. These Citizen Corps Councils will organize public education on disaster mitigation and preparedness, citizen training, and volunteer programs to give people of all ages and backgrounds the opportunity to support their community's emergency services and to safeguard themselves and their property.

By participating in Citizen Corps programs, you can make your home, you neighborhood and your community a safer place to live. To find out more, please visit the Citizen Corps website, *www.citizencorps.gov* or visit *www.fema.gov*.

Activities under Citizen Corps include existing and new federally sponsored programs administered under the Department of Justice (Neighborhood Watch, Volunteers in Police Service, FEMA (Community Emergency Response Teams - CERT), and DHHS (Medical Reserve Corps), as well as other activities that share the common goal of community and family safety.

CERT

The Community Emergency Response Team (CERT) program helps train volunteers to assist first responders in emergency situations in their communities. CERT members give critical support to first responders in emergencies, provide immediate assistance to victims, organize spontaneous volunteers at a disaster site, and collect disaster intelligence to support first responder efforts. The role of a CERT volunteer is self-help/neighbor-help until such time as trained first-response personnel arrive.

The CERT course is taught in the community by a trained team of first responders who have completed a CERT Train-the-Trainer course conducted by their state training office for emergency management, or FEMA's Emergency Management Institute (EMI), located in Emmitsburg, Maryland. Training of CERT volunteers consists of 20 hours of instruction on topics that include disaster preparedness, disaster fire suppression, basic disaster medical operations, and light search and rescue operations.

For additional information on CERT, visit www.training.fema.gov.

Disaster Public Education Websites

Federal Emergency Management Agency	www.fema.gov
U.S. Fire Administration	www.usfa.fema.gov
Citizen Corps	www.citizencorps.gov
Department of Commerce	www.doc.gov
Department of Health and Human Services	www.hhs.gov
Department of Energy	www.energy.gov
U.S. Department of Agriculture	www.usda.gov
Department of Justice	www.justice.gov
Department of Interior	www.doi.gov
Environmental Protection Agency	www.epa.gov
U.S. Postal Service	www.usps.gov
National Oceanic and Atmospheric Administration	www.noaa.gov
National Weather Service	www.nws.noaa.gov
U.S. Geological Survey	www.usgs.gov
Centers for Disease Control and Prevention	www.cdc.gov
Food and Drug Administration	www.fda.gov
Nuclear Regulatory Commission	www.nrc.gov
American Red Cross	www.redcross.org
National Fire Protection Association	www.nfpa.org
Institute for Business and Home Safety	www.ibhs.org

Independent Study Courses

To obtain the following Independent Study Courses from FEMA, Write to:

Independent Study Program
Emergency Management Institute
16825 South Seton Avenue
Emmitsburg, MD 21727

Online: www.training.fema.gov

- IS-1 *Emergency Program Manager: An Orientation to the Position*
- IS-2 *Emergency Preparedness, USA*
- IS-3 *Radiological Emergency Management*
- IS-5 *Hazardous Materials: A Citizen's Orientation*
- IS-7 *A Citizen's Guide to Disaster Assistance*
- IS-8 *Building for the Earthquakes of Tomorrow: Complying with Executive Order 12699*
- IS-9 *Managing Floodplain Development Through the National Flood Insurance Program (NFIP)*
- IS-10 *Animals in Disaster—Module A, Awareness and Preparedness*
- IS-11 *Animals in Disaster—Module B, Community Planning*
- IS-120 *An Orientation to Community Disaster Exercises*
- IS-195 *Basic Incident Command System*
- IS-275 *The EOC's Role in Community Preparedness, Response and Recovery Activities*
- IS-279 *Engineering Principles and Practices for Retrofitting Flood-Prone Residential Structures*
- IS-288 *The Role of Voluntary Agencies in Emergency Management*
- IS-301 *Radiological Emergency Response*
- IS-324 *Community Hurricane Preparedness*
- IS-346 *An Orientation to Hazardous Materials for Medical Personnel*
- IS-393 *Introduction to Mitigation*
- IS-394 *Mitigation for Homeowners*
- IS-513 *The Professional in Emergency Management*
- IS-600 *Special Considerations for FEMA Public Assistance Projects*
- IS-630 *Introduction to the Public Assistance Process*
- SS-534 *Emergency Response to Terrorism (presented by the National Fire Academy–12 hours).*