HURRICANES

There are no other storms on Earth like hurricanes. Views of hurricanes from satellites located thousands of miles above the earth show how unique these powerful, tightly coiled weather systems are.

What is a Hurricane?

A hurricane is a type of tropical cyclone—the general term for all circulating weather systems over tropical waters. (They move counterclockwise in the Northern Hemisphere.) Tropical cyclones are classified as follows:

Tropical Depression—An organized system of clouds and thunderstorms with a defined circulation and maximum sustained winds of 38 mph (33 knots) or less.

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

Hurricane—An intense tropical weather system with a well-defined circulation and maximum sustained winds of 74 mph (64 knots) or higher. In the western Pacific, hurricanes are called "typhoons," and similar storms in the Indian Ocean are called "cyclones."

Hurricanes are products of the tropical ocean and the atmosphere. Powered by heat from the sea, they are steered by the easterly trade winds and the temperate westerlies as well as by their own ferocious energy. Around their core, winds grow with great velocity, generating violent seas. Moving ashore, they sweep the ocean inward while spawning tornadoes and producing torrential rains and floods. Each year on average, ten tropical storms (of which six become hurricanes) develop over the Atlantic Ocean, the Caribbean Sea, or the Gulf of Mexico. Many of these remain over the ocean. However, about five hurricanes strike the United States coastline every three years. Of these five, two will be major hurricanes (category 3 or greater on the Saffir-Simpson Hurricane Scale).

Saffir-Simpson Hurricane Scale

Scale Number (Category)	Sustained Winds (MPH)	Damage	Examples (states or area affected)
1	74-95	Minimal	Florence 1988 Louisiana) Charley 1986 (North Carolina)
2	96-110	Moderate	Kate 1985 (Florida Panhandle) Bob 1991 (Rhode Island)
3	111-130	Extensive	Alicia 1983 (North Texas) Emily 1993 (North Carolina Outer Banks)
4	131-155	Extreme	Andrew 1992 (South Florida) Hugo 1989 (South Carolina)
5	> 155	Catastrophic	Camille 1969 (Louisiana and Mississippi) Labor Day Hurricane 1935 (Florida keys)

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

Breeding grounds

In the eastern Pacific, hurricanes begin forming by mid-May, while in the Atlantic, Caribbean, and Gulf of Mexico, hurricane development starts in June. For the United States, the peak hurricane threat exists from mid-August to late October although the official hurricane season extends through November. Over other parts of the world, such as the western Pacific, hurricanes can occur year-round.

Developing hurricanes gather heat and energy through contact with warm ocean waters. The addition of moisture by evaporation from the sea surface powers them like giant heat engines.

Storm structure

The process by which a disturbance forms and subsequently strengthens into a hurricane depends on at least three conditions. Warm waters and moisture are mentioned above. The third condition is a wind pattern near the ocean surface that spirals air inward. Bands of thunderstorms form, allowing the air to warm further and rise higher into the atmosphere. If the winds at these higher levels are relatively light, this structure can remain intact and allow for additional strengthening.

The center, or eye, of a hurricane is relatively calm. The most violent activity takes place in the area immediately around the eye, called the eyewall. At the top of the eyewall (about 50,000 feet), most of the air is propelled outward, increasing the air's upward motion. Some of the air, however, moves inward and sinks into the eye, creating a cloud-free area.

Storm surge

Storm surge is a large dome of water often 50 to 100 miles wide that sweeps across the coastline near where a hurricane touches land. The surge of high water topped by waves is devastating. The stronger the hurricane and the shallower the offshore water, the higher the surge will be. Along the immediate coast, storm surge is the greatest threat to life and property.

Storm tide

If the storm surge arrives at the same time as the high tide, the water height will be even greater. The storm tide is the combination of the storm surge and the normal astronomical tide.

The hurricane moves ashore. In the above example, a 15-foot surge added to the normal 2-foot tide creates a storm tide of 17 feet. This mound of water, topped by battering waves, moves ashore along an area of the coastline as much as 100 miles wide. The combination of the storm surge, battering waves, and high winds is deadly.

Storm tide facts

Over 6,000 people were killed in the Galveston Hurricane of 1900—most by the storm tide. Hurricane Camille in 1969 produced a 25-foot storm tide in Mississippi. Hurricane Hugo in 1989 generated a 20-foot storm tide in South Carolina.

Winds

Hurricane-force winds, 74 mph or more, can destroy poorly constructed buildings and mobile homes. Debris, such as signs, roofing material, siding, and small items left outside, become flying missiles in hurricanes. Winds often stay above hurricane strength well inland. Hurricane Hugo (1989) battered Charlotte, North Carolina, which is about 175 miles inland, with gusts to near 100 mph, downing trees and power lines and causing massive disruption of electrical service.

Heavy rains and floods

Widespread torrential rains often in excess of 6 inches can produce deadly and destructive floods. This is the major threat to areas well inland.

Tropical Storm Claudette (1979) brought 45 inches of rain to an area near Alvin, Texas, contributing to more than $600 million* in damage.

Long after the winds of Hurricane Diane (1955) subsided, the storm brought floods to Pennsylvania, New York, and New England that contributed to nearly 200 deaths and $4.2 billion* in damage.

Hurricane Agnes (1972) fused with another storm system, producing floods in the northeastern United States that contributed to 122 deaths and $6.4 billion* in damage.

* Adjusted to 1990 dollars.

Tornadoes

Hurricanes also produce tornadoes, which add to the hurricane's destructive power. These tornadoes most often occur in thunderstorms embedded in rain bands well away from the center of the hurricane. However, they can also occur near the eyewall.

Areas at risk

Coastal areas and barrier islands

All Atlantic and Gulf coastal areas are subject to hurricanes or tropical storms. Although rarely struck by hurricanes, parts of the southwestern United States and the Pacific Coast suffer heavy rains and floods each year from the remnants of hurricanes spawned off Mexico. Islands, such as Hawaii, Guam, American Samoa, and Puerto Rico, are also subject to hurricanes. During 1993, Guam was battered by five typhoons. Hurricane Iniki struck the island of Kauai, Hawaii, on September 11, 1992, resulting in $1.8 billion in damage.

Due to the limited number of evacuation routes, barrier islands are especially vulnerable to hurricanes. People on barrier islands and in vulnerable coastal areas may be asked by local officials to evacuate well in advance of a hurricane landfall. If you are asked to evacuate, do so IMMEDIATELY!

Inland areas

Hurricanes affect inland areas with high winds, floods, and tornadoes. Listen carefully to local authorities to determine what threats you can expect and take the necessary precautions to protect yourself, your family, and your property.

Camille—August 14-22, 1969: Twenty-seven inches of rain in Virginia caused severe flash flooding.

Agnes—June 14-22, 1972: Devastating floods from North Carolina to New York produced many record-breaking river crests. The storm generated 15 tornadoes in Florida and two in Georgia.

Hugo—September 10-22, 1989: Wind gusts reached nearly 100 mph as far inland as Charlotte, North Carolina. Hugo sustained hurricane-strength winds until shortly after it passed west of Charlotte.

Andrew—August 16-28, 1992: Damage in the United States is estimated at $25 billion, making Andrew the most expensive hurricane in United States history. Wind gusts in south Florida were estimated to be at least 175 mph.

ARE YOU READY FOR A HURRICANE?

Here's what to do to prepare for such an emergency.

Before the hurricane season...

- Know the hurricane risks in your area.
- Learn safe routes inland.
- Learn location of official shelters.
- Review needs and working condition of emergency equipment, such as flashlights, battery-powered radios, etc.
- Ensure that enough nonperishable food and water supplies are on hand.
- Obtain and store materials, such as plywood, necessary to properly secure your home.
- Clear loose and clogged rain gutters and downspouts.
- Keep trees and shrubbery trimmed.
- Determine where to move your boat in an emergency.
- Review your insurance policy.

Individuals with special needs or others requiring more information should contact their local National Weather Service office, emergency management office, or American Red Cross chapter.

During the Storm

When in a watch area...

- Frequently listen to radio, TV, or NOAA Weather Radio for official bulletins of the storm's progress.
- Fuel and service family vehicles.
- Inspect and secure mobile home tie downs.
- Prepare to cover all window and door openings with shutters or other shielding materials.
- Check batteries and stock up on canned food, first-aid supplies, drinking water, and medications.
- Prepare to bring inside lawn furniture and other loose, lightweight objects, such as garbage cans, garden tools, etc.
- Have on hand an extra supply of cash.

Plan to evacuate if you...

- Live in a mobile home. They are unsafe in high winds, no matter how well fastened to the ground.
- Live on the coastline, an offshore island, or near a river or a flood plain.
- Live in a high-rise. Hurricane winds are stronger at higher elevations.

When in a warning area...

- Closely monitor radio, TV, or NOAA Weather Radio for official bulletins.
- Complete preparation activities, such as putting up storm shutters, storing loose objects, etc.
- Follow instructions issued by local officials. Leave immediately if told to do so!
- If evacuating, leave early (if possible, in daylight). Stay with friends or relatives, at a low-rise inland hotel or motel, or go to a predesignated public shelter outside a flood zone.
- Leave mobile homes in any case.
- Notify neighbors and a family member outside of the warned area of your evacuation plans.
- Put food and water out for a pet if you cannot take it with you. Public health regulations do not allow pets in public shelters, nor do most hotels or motels allow them.

What to bring to a shelter: first-aid kit; medicine; baby food and diapers; cards, games, books; toiletries; battery-powered radio; flashlight (one per person); extra batteries; blankets or sleeping bags; identification, valuable papers (insurance), and cash.

Reminder! If you ARE told to leave, do so immediately!

If staying in a home...

- Only stay in a home if you have NOT been ordered to leave. Stay inside a well-constructed building. In a structure, such as a home, examine the building and plan in advance what you will do if winds become strong. Strong winds can produce deadly missiles and structural failure.

- Turn refrigerator to maximum cold and open only when necessary.
- Turn off utilities if told to do so by authorities.
- Turn off propane tanks.
- Unplug small appliances.
- Fill bathtub and large containers with water for sanitary purposes.

If winds become strong...

- Stay away from windows and doors even if they are covered. Take refuge in a small interior room, closet, or hallway.
- Close all interior doors. Secure and brace external doors.
- If you are in a two-story house, go to an interior first-floor room, such as a bathroom or closet.
- If you are in a multiple-story building and away from the water, go to the first or second floors and take refuge in the halls or other interior rooms away from windows.
- Lie on the floor under a table or another sturdy object.

Be alert for...

- Tornadoes that often are spawned by hurricanes.
- The calm "eye" of the storm. After the eye passes, the winds will change direction and quickly return to hurricane force.

Community preparedness plans

Each community subject to a hurricane threat should develop its own hurricane safety plan. After you have developed a personal and family safety plan, you may want to find out about your community safety plan. Your local officials should have the most detailed information for your immediate area. Please listen to and follow their recommendations both before, during, and after the storm.

After the storm...

- Keep listening to radio, TV, or NOAA Weather Radio.
- Wait until an area is declared safe before entering.
- Roads may be closed for your protection. If you come upon a barricade or a flooded road, turn around and go another way!
- Avoid weakened bridges and washed out roads. Do not drive into flooded areas.
- Stay on firm ground. Moving water only 6 inches deep can sweep you off your feet. Standing water may be electrically charged from underground or downed power lines.
- Check gas, water, and electrical lines and appliances for damage.
- Do not drink or prepare food with tap water until you are certain that it is not contaminated.
- Avoid using candles and other open flames indoors. Use a flashlight to inspect for damage.
- Use the telephone to report life-threatening emergencies only.
- Be especially cautious if using a chainsaw to cut fallen trees.

HURRICANE ACTIVITY: TRACKING A HURRICANE

Purpose:

1. Improve map skills by plotting coordinates of a hurricane.
2. Discover if there is time for a family to prepare for a major hazard.
3. Learn if a disaster can be lessened by appropriate actions.

Materials:

Chart of Atlantic and Gulf Region

Hurricane Tracking Reports (from "Discover! The World of Science and Technology," National Science and Technology Week 1993-1994, National Science Foundation)

Activity:

1. Divide students into groups of two or three.
2. Ask students to take different roles: a) a meteorologist at a hurricane center; b) a television news reporter in any of the major cities; c) a radio broadcaster reading news bulletins; d) a mayor who must decide when (or if) to order an evacuation; and e) a family trying to decide what to do.
3. Use the following cities:

Miami, Florida	Altantic City, New Jersey
Cape Canaveral, Florida	New Orleans, Louisiana
Savannah, Georgia	Galveston, Texas
Charleston, South Carolina	San Juan, Puerto Rico
Cape Hatteras, North Carolina	Santa Domingo, Dominican Republic
	Nassau, The Bahamas

4. Write a journal on your observations and thoughts about the hurricane. At what point do you decide to prepare?
5. Inventory your home. What supplies do you need to get from the store to last for three days with no electricity, no running water, no heat? Consider special needs of each member of your family.

(Review section on Your Family Disaster Supplies Kit. View "Adventures of the Disaster Dudes.")

Hurricane Tracking Reports

9/14/89 - 12:00 noon

Tropical Storm Center located 13.3N latitude; 47.6W longitude
Winds 80 kilometers per hour (50 mph)
Flooding and heavy rains to be expected

9/15/89 - 6:00 a.m.

Tropical Storm Center located 14.0N Latitude, 51.9W longitude
Winds 110 kilometers (68 mph)
High tidal waves and flooding expected

9/16/89 - 12:00 noon

Hurricane Center located 15.4N latitude and 58.4W longitude
Winds sustained at 120 km per hour (75 mph) with gusts to 140 km per hour (87 mph)

9/17/89 - 6:00 p.m.

Hurricane Center located 16.9N latitude and 63.5W longitude
Winds 125 km per hour (78 mph)
Flooding 2-2.4 m (6-8 ft) above normal
Rainfall of 15-26 cm (6-10 in.) in path of hurricane

09/18/89 - 3:23 a.m.

Hurricane Center located 17N latitude and 64W longitude
Winds 120 km per hour (75 mph) with gusts to 140 km per hour (87 mph)
Flooding of 2.4 m (8 ft) above normal
Rainfall amounts up to 26 cm (10 in.) in path of hurricane

09/18/89 - 10:18 p.m.

Hurricane Center located 19N latitude and 67W longitude
Maximum winds of 100 km per hour (62 mph) with gusts of 120 km per hour (75 mph)
Storm surge flooding of 1.2-2 m (4-6 ft) above tide levels
Rainfall amounts to 26 cm (10 in.) in path of hurricane

09/19/89 - 3:45 a.m.

Hurricane Center located 20N latitude and 67W longitude
Maximum winds sustained at 95 km per hour (59 mph) with gusts of 110 km per hour (68 mph)
Storm surge flooding of 1.2-2 m (4-6 ft) above tide levels
Rainfall amounts to 26 cm (10 in.) in path of hurricane

09/19/89 - 4:55 p.m.

Hurricane Center located 18N latitude and 66W longitude
Winds sustained at 110 km per hour (68 mph) with gusts of 120 km per hour (75 mph)
Flooding of 1.2-2 m (4-6 ft) above normal
Rainfall amounts to 38 cm (15 in) in path of hurricane

09/20/89 - 3:35 p.m

Hurricane Center located 24N latitude and 70W longitude
Winds sustained at 90 km per hour (56 mph) with gusts of 105 km per hour (65 mph)

09/20/89 - 3:59 p.m.

Hurricane Center located 25N latitude and 71W longitude
Winds sustained at 90 km per hour (56 mph) with gusts of 105 km per hour (65 mph)

09/20/89 - 10:06 p.m.

Hurricane Center located 27N latitude and 73W longitude
Winds sustained at 90 km per hour (56 mph) with gusts of 110 km per hour (68 mph)

09/21/89 - 3:39 a.m.

Hurricane Center located 28N latitude and 74W longitude
Winds sustained at 95 km per hour (59 mph) with gusts of 110 km per hour (68 mph)

09/21/89 - 10:40 a.m.

Hurricane Center located 29N latitude and 76W longitude
Winds sustained at 95 km per hour (59 mph) with gusts of 110 km per hour (68 mph)
Storm surge flooding 2.4-3.6 m (8-12 ft) above normal tide
Rainfall amounts of up to 26 cm (10 in.) in path of storm

09/21/89 - 7:25 p.m.

Hurricane Center located 30N latitude and 78W longitude
Winds sustained at 100 km per hour (62 mph) with gusts of 130 km per hour (81 mph)
Storm surge flooding 3-5 m (10-15 ft) above normal tide
Rainfall amounts of up to 26 cm (10 in.) in path of storm

09/21/89 - 9:58 p.m.

Hurricane Center located 31N latitude and 78W longitude
Winds sustained at 120 km per hour (75 mph) with gusts of 140 km per hour (87 mph)
Storm surge flooding 4-5 m (12-17 ft) above normal tides
Rainfall amounts of up to 26 cm (10 in.) in path of storm

09/22/89 - 3:42 a.m.

Hurricane Center located 32N latitude and 80W longitude
Winds sustained at 60 km per hour (37 mph) with gusts of 75 km per hour (47 mph)
Storm surge flooding 4-5 m (12-17 ft) above normal tides
Rainfall amounts of up to 26 cm (10 in.) in path of storm

Tracking a Hurricane

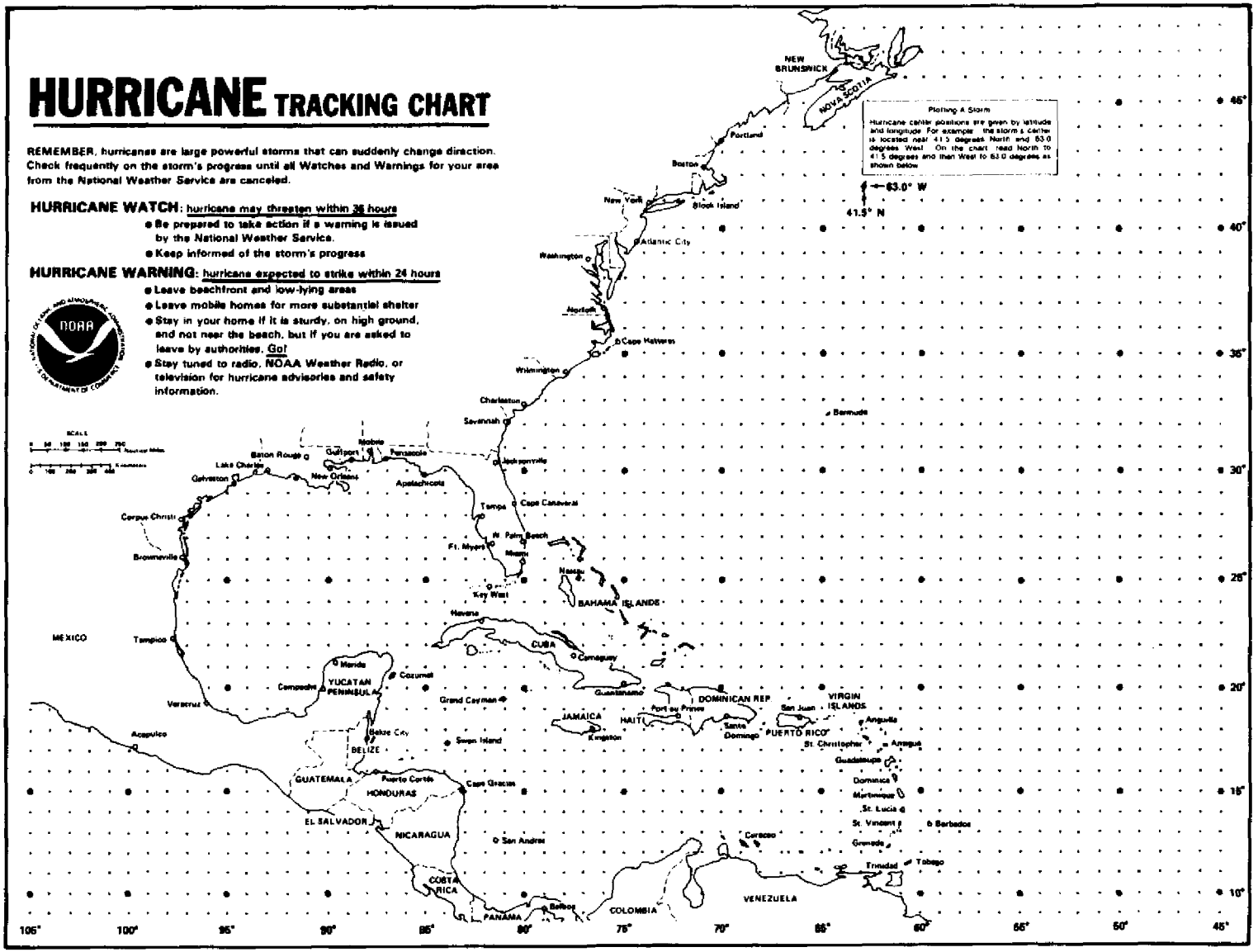
Use this map to track the simulated hurricane in the activity...and to track a real hurricane. Listen to weather reports on radio and TV, and note updated location reports. Track the hurricane each day until hurricane warnings are no longer issued. Mark each change of direction and date/time of new report, using a different colored pencil or marker for easy identification and better tracking.

Hurricane Name:

_____

Date Hurricane Formed:

_____



EARTHQUAKES

Earthquakes strike suddenly, without warning. On a yearly basis, 70 to 75 damaging earthquakes occur throughout the world. The majority occur along plate boundaries, though others occur deep in the interior of plates. Where earthquakes have occurred in the past, they will happen again.

What is an earthquake?

As the stiff, thin plates that make up the upper 20 to 35 miles of the Earth slowly, ceaselessly move in relation to one another, pressures build, especially along the edges of the plates. When pressure builds to the point that it exceeds the strength of the rock, the rock fails, forming a fracture miles below the surface of the Earth. Energy waves move outward from the focus of the earthquake, traveling rapidly toward the surface. As the waves break out of the rocks, buildings sway. The longer the ground shakes, the greater the chance for major damage.

What are aftershocks?

Aftershocks are hundreds and thousands of earthquakes that occur in the same area in which the initial (or main) earthquake occurred. Though these earthquakes are smaller than the mainshock, they can cause further damage to weakened buildings. In general, the number and size of aftershocks taper off, getting fewer and smaller over time.

What causes the damage seen following an earthquake?

Groundshaking—second after second—causing buildings to twist and flex. If buildings are not designed to withstand groundshaking, or they have been poorly maintained or they have been damaged by previous earthquakes, they will suffer damage.

Liquefaction of loose or water-filled sediments along bays, lakes, rivers, or other wet environments can cause tremendous building damage. Shaking of soils moves water out of sediments forming a soft quicksand-like material that can no longer support the weight of buildings. Buildings sink into the liquefied soil, and upper stories collapse.

Ground rupture or the actual formation of a crack at the surface is less common. If this occurs, buildings in the rupture zone suffer great damage.

How are earthquakes measured?

Three different systems are used to classify earthquakes. The Modified Mercalli Scale looks at the amount of damage an earthquake did. Areas of similar damage are connected by isoseismal lines. A contour map of damage can be drawn, typically with the greatest damage in the center and lesser damage on the outside. The scale ranges from I (not felt by people; only detected by seismograph) to XII (almost everything destroyed).

The Richter Scale is used to quantify ground movement and can be equated to energy released. The scale is open-ended. An earthquake registering 1.0 roughly compares to the energy released by 143 grams (5 oz.) of TNT at a construction site; an earthquake registering 4.0 roughly compares to the energy released by a small atomic bomb or 6 tons of TNT.

For very large earthquakes, a new scale called the Moment Magnitude is used to characterize the energy released, the area ruptured, and the duration of the earthquake waves.

Facts:

1. Alaska experiences the largest number of earthquakes each year.
2. The largest earthquakes in U.S. history occurred in Prince William Sound, Alaska, (1968); New Madrid, Missouri, (1811 & 1812); Guam (1993); and San Francisco, California, (1908).
3. It is safest to stay inside during an earthquake.
4. All 50 states and all U.S. territories are at some risk from earthquakes.
5. At least 39 states are at moderate-to-high risk from earthquakes.

ARE YOU READY FOR AN EARTHQUAKE?

Here's what to do to prepare for such an emergency.

Prepare a home earthquake plan

- Choose a safe place in every room—under a sturdy table or desk or against an inside wall—where nothing can fall on you.
- Practice DROP, COVER, AND HOLD ON at least twice a year. Drop under a sturdy desk or table, hold on, and protect your eyes by pressing your face against your arm. If there's no table or desk nearby, sit on the floor against an interior wall away from windows, bookcases, or tall furniture that could fall on you. Teach everyone to DROP, COVER, AND HOLD ON!
- Choose an out-of-town family contact.
- Eliminate hazards, including bolting bookcases, china cabinets, and other tall furniture to wall studs; installing strong latches on cupboards; strapping the water heater to wall studs
- Take a first-aid class from your local American Red Cross chapter. Keep your training current.
- Get training in how to use a fire extinguisher from your local fire department.
- Inform guests, babysitters, and caregivers of your plan.
- Prepare a disaster supplies kit for home and car.

Know what to do when the shaking begins

- DROP, COVER, AND HOLD ON! Move only a few steps to a nearby safe place. Stay indoors until the shaking stops and you are sure it's safe to exit. Stay away from windows. In a high-rise building, expect the fire alarms and sprinklers to go off during an earthquake.
- If you are in bed, hold on and stay there, protecting your head with a pillow.
- If you are outdoors, find a clear spot away from buildings, trees, and power lines. DROP to the ground.
- If you are in a car, slow down and drive to a clear place (as described above). Stay in the car until the shaking stops.

What to do after the shaking stops

- Check yourself for injuries. Protect yourself from possible or further injury by putting on long pants, a long-sleeved shirt, sturdy shoes, and work gloves.
- Check others for injuries. Give first-aid for serious injuries.
- Look for and extinguish small fires. Eliminate fire hazards. Turn off the gas if you smell gas or think it is leaking. (Remember, only a professional can turn it back on.)
- Listen to the radio for instructions.
- Expect aftershocks. Each time you feel one, DROP, COVER, AND HOLD ON!
- Inspect home for damage. Get everyone out if your home is unsafe.
- Use the telephone only to report on life-threatening emergencies.

EARTHQUAKE ACTIVITY: YOU CAN BUILD A SAFER WORLD

Purpose:

1. Learn that ground conditions can affect the intensity of an earthquake.
2. Discover that different design and construction methods can determine how well a building withstands shaking from an earthquake.

Materials:

Miniature marshmallows
Round toothpicks (several boxes)
Modeling clay (cut in 4" x 4" x 1" slabs)
Firm Gelatin (follow directions; make ahead; cut to same dimensions as clay)
8" plates (two per group)

Activity:

1. Divide students into groups of 2 to 4; set up at separate tables.
2. Look at materials for activity.
3. Discuss the goal of building two identical three-story towers, using marshmallows and toothpicks, that will not topple in an earthquake. One will be anchored in gelatin; the other in clay.
4. Discuss as a team your ideas of design. Divide the tasks and construct the towers.
5. Rally at one large table. Secure towers to table by placing each plate on a rolled piece of masking tape.
6. Let the earthquake begin. First, shake the table gently from side to side like the initial waves of an earthquake. Next, shake the table violently with a pushing motion. Finally, lift one end of the table, then the other, simulating long surface waves.

Follow-up:

1. Discuss observations of which designs and construction methods were strongest; weakest.
2. Try rebuilding a stronger tower.
3. Discuss how you might be able to tell if a house or building was well built to withstand large earthquakes.
4. Do you think all states should require all buildings to be constructed to withstand the forces of an earthquake? Would you have to change the design for a hurricane?

Firm Gelatin

2 packages unflavored gelatin (Knox brand)

1 6 oz pkg jello gelatin

2-1/2 c water

Dissolve unflavored gelatin in 1-1/2 c water. Set aside.

Boil 1 c water; add jello gelatin. Stir until dissolved.

Add gelatin mixture. Stir.

Pour into greased rectangular pan (9" x 12").

Refrigerate until firm (about 2 hours).

Activity was modified from 4-H SERIES "Beyond Duck and Cover," 4-H 7018, University of California, Div. of Agriculture and Natural Resources.

WILDFIRES

More and more people are making their homes in woodland settings—in or near forests, rural areas, or remote mountain sites.

There homeowners enjoy the beauty of the environment but face the very real danger of wildfire.

Wildfires often begin unnoticed. They spread quickly, igniting brush, trees, and homes. Reduce your risk by preparing now—before wildfire strikes. Meet with your family to decide what to do and where to go if wildfires threaten your area. Take steps to protect your family, your home, and your property.

Practice wildfire safety

People start most wildfires. Find out how you can promote and practice wildfire safety.

- Contact your local fire department, health department, or forestry office for information on fire laws. Make sure that fire vehicles can get to your home. Clearly mark all driveway entrances and display your name and address.
- Report hazardous conditions that could cause a wildfire.
- Teach others about fire safety.
- Keep matches out of reach of children.
- Plan several escape routes away from your home—by car and by foot.
- Talk to your neighbors about wildfire safety. Plan how the neighborhood could work together after a wildfire. Make a list of your neighbors' skills such as medical or technical.
- Consider how you could help neighbors who have special needs such as elderly or disabled people. Make plans to take care of younger children who may be on their own if parents can't get home.

Before wildfire threatens

- Design and landscape your home with wildfire safety in mind. Select materials and plants that can help contain fire rather than fuel it. Plant fire-resistant shrubs and trees. For example, hardwood trees are less flammable than pine, evergreen, eucalyptus or fir trees.
- Create a 30-to-50 foot safety zone around your home.
- Within this area, you can take steps to reduce potential exposure to flames and radiant heat. Homes built in pine forests should have a minimum safety zone of 100 feet. If your home sits on a steep slope, standard protective measures may not suffice. Contact your local fire department or forestry office for additional information.
- Rake leaves, dead limbs, and twigs. Clear all flammable vegetation. Remove leaves and rubbish from under structures.
- Thin out a 15-foot space between tree crowns, and remove limbs within 15 feet of the ground.
- Remove dead branches that extend over the roof.
- Prune tree branches and shrubs within 15 feet of stovepipe or chimney outlet.
- Ask the power company to clear branches from powerlines.
- Remove vines from the walls of your home.
- Mow grass regularly.
- Clear a 10-foot area around propane tanks and the barbecue. Place a screen over the grill—use a nonflammable material with mesh no coarser than one-quarter inch.
- Regularly dispose of newspapers and rubbish at an approved site. Follow local burning regulations.
- Place stove, fireplace, and grill ashes in a metal bucket, soak in water for two days, then bury the cold ashes in mineral soil.
- Store gasoline, oily rags, and other flammable materials in approved safety cans. Place cans in a safe location away from the bases of buildings.
- Stack firewood at least 100 feet away and uphill from your home. Clear combustible material within 20 feet. Use only UL-approved woodburning devises.

Plan your water needs

- Identify and maintain an adequate outside water source such as a small pond, a cistern, a well, a swimming pool, or a hydrant.
- Have a garden hose that is long enough to reach any area of the home or other structures on the property.
- Install freeze-proof exterior water outlets on at least two sides of home and near other structures on the property. Install additional outlet at least 50 feet from the home.
- Consider obtaining a portable gasoline-powered pump in case electrical power is cut off.

When wildfire threatens

If you are warned that a wildfire is threatening your area, listen to your battery-powered radio for reports and evacuation information. Follow the instructions of local officials.

- Back your car into the garage or park it in an open space facing the direction of escape. Leave the key in the ignition. Close garage windows and doors, but leave them unlocked. Disconnect automatic garage door openers.
- Confine pets to one room. Make plans to care for your pets in case you must evacuate.
- Arrange temporary housing at a friend or relative's home outside the threatened area.
- If advised to evacuate, do so immediately.
- Wear protective clothing—sturdy shoes, cotton or woolen clothing, long pants, a long-sleeved shirt, gloves, and a handkerchief to protect your face.
- Take your disaster supplies kit.
- Lock your home.
- Tell someone when you leave and where you are going.
- Choose a route away from fire hazards. Watch for changes in the speed and direction of fire and smoke.
- If you are sure you have time, take steps to protect your home:

Inside

- Close windows, vents, doors, venetian blinds, and noncombustible window coverings and heavy drapes. Remove lightweight curtains.
- Shut off gas at the meter.
- Open fireplace damper. Close fireplace screens.
- Move flammable furniture into center of home away from windows and sliding glass doors.
- Turn on a light in each room to increase the visibility of your home in heavy smoke.

Outside

- Seal attic and ground vents with precut plywood or commercial seals.
- Turn off propane tanks.
- Place combustible patio furniture inside.
- Connect the garden hose to outside taps.
- Set up the portable gasoline-powered pump.
- Place lawn sprinklers on the roof and near above-ground fuel tanks. Wet the roof.
- Wet or remove shrubs within 15 feet of the home.
- Gather fire tools.

FLOODS AND FLASH FLOODS

Here's what to do to prepare for such emergencies.

Know what to expect...

- Know your area's flood risk—if unsure, call your local American Red Cross chapter or your local emergency manager.
- If it has been raining hard for several hours, or steadily raining for several days, be alert to the possibility of a flood.
- Listen to local radio or TV stations or to NOAA Weather Radio for flood information.
- Floods can take from several hours to several days to develop. A flood WATCH means a flood is possible in your area. A flood WARNING means flooding is already occurring or will occur soon in your area.
- Flash floods can take only a few minutes to a few hours to develop. A flash flood WATCH means flash flooding is possible in your area. A flash flood WARNING means a flash flood is occurring or will occur very soon.