

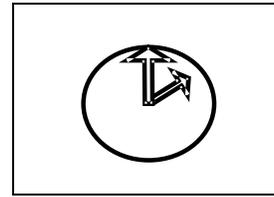
Instructor Guide to Unit Ten
All Hazards

1. The goal of this unit is to provide participants with general definitions, preparation, response and recovery information for all hazards. Each category is covered in writing; however, the CERT instruction team may only cover issues that are pertinent to the immediate community or region.

2. This is the content for Unit Ten:
- a. Dams
 - b. Earthquakes
 - c. Extreme heat
 - d. Floods
 - e. Hazardous materials
 - f. Hurricanes
 - g. Landslides and debris flow
 - h. Nuclear emergencies
 - i. Terrorism
 - j. Thunderstorms and lighting
 - k. Tornadoes
 - l. Tsunamis
 - m. Volcanoes
 - n. Wild-land fires
 - o. Winter storms

3. Supplies needed for Unit Ten:
- LCD projector
 - Computer linked to LCD projector
 - Computer disk containing Unit Ten power point presentation
 - Instructor Guide for Unit Ten
 - Participant's Manual for CERT

4. Instructional staffing requirements:
 Although one instructor is enough to present the material, because of the length of the unit, use of several instructors would be better.



5. Unit ten is scheduled for 3 hours
 This is the suggested time-line:

- Overview and objectives 5 minutes
- Mitigation efforts 10 minutes
 - a. 10 minutes
 - b. 10 minutes
 - c. 10 minutes
 - d. 10 minutes
 - e. 10 minutes
 - f. 10 minutes
 - g. 10 minutes
 - h. 10 minutes
 - i. 10 minutes
 - j. 10 minutes
 - k. 10 minutes
 - l. 10 minutes
 - m. 10 minutes
 - n. 10 minutes
 - o. 10 minutes
- Performance Measure activity 10 minutes
- Break – placement at instructors discretion 15 minutes.



The clock is found throughout the instructor guide it indicates how many minutes it is suggested be spent on each subject area.

Time spent on each unit can be maneuvered by dropping content and referring to its placement in the take-home materials. This permits flexibility on the part of the instructor and encourages participants to question or discuss course matters. It also holds the instructor to the time limit for the unit without expecting participants to stay overtime or to have instructors who follow to give up their time.

This unit is scheduled for 3 hours. It can be expanded or contracted based on regional hazard needs or existing circumstances. A 15-minute break is scheduled at the discretion of the instructor.

The power point slides have descriptors of visual images but the instructor may need to explain them further.

The instructor(s) for this unit should know the material well and avoid reading slides.

Display this slide as participants enter the room.



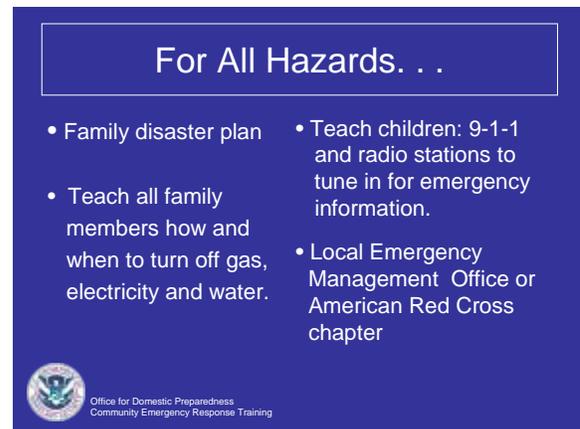
Review the objectives and inform participants that a performance measure activity is formatted into this unit at the end of the materials to help them obtain the objectives.

This is the point where the instructor should indicate if all hazards will be covered in the same depth or if some regional hazards will be highlighted and other less likely to occur hazards will not be covered in depth.



This slide introduces the concept of mitigation for this unit. Mitigation has been covered elsewhere in the CERT curriculum.

These two slides review basic concepts participants should keep in mind for each of the hazards reviewed in this unit.



This slide is part of the 10 minutes allotted for Mitigation covered on page 2 of 19.



A dam is a barrier controlling the flow of water. It can be made of earth or concrete and built across a river or stream to obstruct or control the flow of water. There are about 80,000 dams in the United States today, the majority of which are privately owned. Other owners are state and local authorities, public utilities, and federal agencies.

Several things can cause a dam to fail: first, if they are not designed, operated and maintained properly, or when major flooding overwhelms the dam's capacity or structural damage caused by people, earthquakes or other natural disasters.

The energy of the water stored behind even a small dam is capable of causing loss of life and great property damage due to flooding, landslides and mudslides to people, communities or property downstream of the dam.

The National Dam Safety Program is dedicated to protecting the lives of American citizens and their property from the risks associated with the development, operation, and maintenance of America's dams.

For All Hazards continued.

- 72 hour (3-day) kit
- Mitigate – Prevent, reduce, or lessen the damaging effects
- Develop an emergency communication plan
- Know your insurance Keep it up-to-date



Dams

- Dams
- When or where can a dam break?
- What damage can occur from dam failure?
- Emergency Information



The Libby Dam in Montana



<http://www.libbynt.com/areaattractions/libbydam.htm>





An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free causing the ground to shake.

Stay inside. The best protection during an earthquake is to get under heavy furniture such as a desk, table, or bench.

If outdoors: Move into the open, away from buildings, streetlights, and utility wires. Once in the open, stay there until the shaking stops.

If in a moving vehicle: Move to a clear area away from buildings, tree, overpasses or utility wires. Stop quickly and stay in the vehicle. Once the shaking has stopped, proceed with caution. Avoid bridges or ramps that might have been damaged by the quake.

The greatest danger exists directly outside buildings, at exits, and alongside exterior walls.

Ground movement during an earthquake is seldom the direct cause of death or injury. Most earthquake-related casualties result from collapsing walls, flying glass, and falling objects.

Earthquake

Earthquakes?

When and where do earthquakes occur?

What damage can occur from an earthquake?

Emergency Information.



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Earthquake Damage to Structures



San Miguel, CA
Photographer - Dane Golden



Seattle, WA
Photographer - John Shea



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Earthquake Damage to Infrastructure



Collapsed highway
Northridge, CA
Photograph - FEMA News Photo



Damage to bridge over water
Olympia, WA
Photographer - Robert A. Eplett



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Temperatures 10 degrees or more above the average high temperature for a region and last for several weeks are defined as extreme heat. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a “dome” of high atmospheric pressure traps hazy, damp air near the ground. Excessively dry and hot conditions provoke dust storms and low visibility. Droughts occur when a long period passes without substantial rainfall.

Heat kills by pushing the human body beyond its limits.

Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition

A prolonged drought can have a serious economic impact on a community. Increased demand for water and electricity may result in shortages of resources.



A flood is a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties, at least one of which is your property from: overflow of inland or tidal waters, unusual accumulation , collapse of land along the shore or lake, dam failures or flash floods.

Extreme Heat / Drought



'Dust Devils', NV
Photographer - K. Dewey, High Plains
Regional Climate Center Boulder City, NV



Lake Meade, NV
Low Water Mark
Photographer - K. Dewey, High Plains
Regional Climate Center Boulder City, NV



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Extreme Heat

- Extreme heat?
- Where does extreme heat occur?
- What damage can occur from extreme heat?
- Emergency Information.



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Flood

- Flooding.
- When and where do floods occur?
- What damage can occur from a flood?
- Emergency Information.



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Floods are the most common and widespread of all natural disasters. Tribal, State, and Territorial communities in the United States have experienced some kind of flooding, after spring rains, heavy thunderstorms, or winter snow thaws. **Your homeowners or renters insurance does not cover flood damage.**

Fill bathtubs, sinks, and jugs with clean water in case water becomes contaminated.

Listen to a battery-operated radio for the latest storm information.

If local authorities instruct you to do so, turn off all utilities at the main power switch and close the main gas valve.

If told by emergency management or law enforcement personnel to evacuate your home, do so immediately!

If the waters start to rise inside your house before you have evacuated, retreat to the second floor, the attic, and if necessary, the roof.

Floodwaters may carry raw sewage, chemical waste and other disease-spreading substances.

Avoid walking through floodwaters. As little as six inches of moving water can knock you off your feet.

Do not drive through a flooded area. A car can be carried away by just 2 feet of floodwater. More people drown in their cars than anywhere.

Look out for animals -- especially snakes. Animals lose their homes in floods too.

Flood Damage



Ice Jams during flooding
FEMA News Photo



Community members sandbagging
Photographer – Dave Saville



Flood Damage



Grand Forks Herald Newspaper building after flood caused fire
Photographer – Phil Cogan



Flooded railroad bridge with 24 foot clearance
Photographer – Phil Cogan



Flood Damage



Earth dike at 52 feet, Floodwaters at 54 feet +.
Photographer – Dave Saville



Sheriff's dingo on patrol in flooded area
Photographer – Dave Saville



Take steps to reduce your risk of future floods. Make sure to follow local building codes and ordinances when rebuilding, and use flood-resistant materials and techniques to protect yourself and your property from future flood damage.



Hazardous materials are chemical substances, which if released or misused can pose a threat to the environment or health. These chemicals are used in industry, agriculture, medicine, research, and consumer goods. Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. These substances are most often released because of transportation accidents or because of chemical accidents in plants.

Between 1982 and 1991, there was an annual average of 6,774 hazardous materials transportation incidents. In 1991, 9,069 transportation incidents resulted in 10 deaths and 436 injuries.

Varying quantities of hazardous materials are manufactured, used, or stored at an estimated 4.5 million facilities in the United States.

Modes of transportation experiencing incidents involving hazardous materials included air, highway, railway, waterways and pipelines.

Flood Damage



Humane Society animal rescue
Photographer – Dave Saville



Rescued cat
Photographer – Dave Saville



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Hazardous materials

- What are hazardous materials?
- When and where do hazardous material disasters occur?
- What damage can occur from an hazardous materials disaster?
- Emergency Information.



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Hazardous Materials



Oil Spill at Valdez Harbor
Photographer - Terry FitzPatrick



Hazardous Materials drill
Chardon Ohio
<http://www.chardonfire.com/training3.htm>



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A hurricane is a tropical storm with winds that have reached a constant speed of 74 miles per hour or more. Hurricane winds blow in a large spiral around a relative calm center known as the "eye." The "eye" is generally 20 to 30 miles wide, and the storm may extend outward 400 miles.

August and September are peak months during the hurricane season, which lasts from June 1 through November 30.

During a Hurricane Warning – issued when hurricane conditions are expected in 24 hours or less (e.g. winds of 74 miles per hour or greater or dangerously high water and rough seas).

Listen constantly to a battery-operated radio or television for official instructions. If in a mobile home, check tie-downs and evacuate immediately.

If officials indicate evacuation is necessary: Leave as soon as possible

Secure your home by unplugging appliances and turning off electricity and the main water valve.

Tell someone outside the storm area where you are going.

If time permits, and you live in an identified surge zone, elevate furniture to protect it from flooding or better yet, move it to a higher floor.

Take pre-assembled emergency supplies, warm protective clothing, blankets and sleeping bags to shelter.

Hurricanes

- Hurricanes.
- When and where do hurricanes occur?
- What damage can occur from a hurricane?
- Emergency Information.



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Hurricane Infrastructure Damage



Boardwalk and shoreline
Damage from storm surge
Photographer – Mark Wolfe



Road damage from hurricane
Photographer – Dave Saville



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Hurricane Damage to Homes



Shoreline mitigated home and inland mitigated home
both damaged by hurricane.

Photographer – Dave Saville



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Return home only after authorities advise. Avoid loose or dangling power lines and report them immediately to the Power Company, police, or fire department. Enter your home with caution. Ventilate and dry your home. Check refrigerated foods for spoilage. Take pictures of the damage. Drive only if absolutely necessary



Landslides are typically associated with periods of heavy rainfall or rapid snow melt and tend to worsen the effects of flooding that often accompanies these events.

Mudflows (or debris flows) are rivers of rock, earth, and other debris saturated with water.

If inside a building: stay inside and take cover under a desk, table, or other piece of sturdy furniture.

Try and get out of the path of the landslide or mudflow.

Move quickly to the nearest high ground in a direction away from the path.

If rocks and other debris are approaching, run for the nearest shelter such as a group of trees or a building.

If escape is not possible, curl into a tight ball and protect your head.

Hurricane Recovery Efforts



Power restoration efforts
Photographer – Michael Rieger



Disaster Temporary Housing
Photographer – Andrea Booher



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Landslides and Mudslides

- Landslides and mudslides.
- When and where do landslides and mudslides occur?
- What damage can occur from landslides and mudslides?
- Emergency Information.



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Landslides and Mudslides



Landslide at Peers Creek, NC
Photographer – Lief Skoogfors



Mudslide, Southern CA
Photographer – Laura Lee



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This section deals with what happens if a release occurs at a nuclear plant, or when material destined for a storage facility is in an accident. If participants raise issues about 'dirty bombs' (bombs that have radioactive elements as a part of the makeup) suggest that you will address that issue in the terrorism section that is coming up.

These two slides represent nuclear energy emergencies that have happened in recent history. The Three Mile Island emergency happened in the late 1970's and the community still deals with clean up issues. The Los Alamos National Lab never had a leak, but is used as an example of how disasters can piggyback each other based on what humans have constructed in the geographic area of the disasters path. That near miss happened in the early 2000's.

Teaching tip:

In this unit it is a good idea for the instructor to be aware that some participants may want to politicize the conversation and direct it toward their political party preference. It is a good idea to redirect that type of conversation to break time or personal time. This unit should prepare CERT trained individuals to deal with the emergency needs of the community. Although all things have political value, getting into blame-game conversations can cause defensiveness and difficulty in the classroom climate. Good Luck with this!

Nuclear Energy Emergency

- What is a nuclear energy emergency?
- When and where do nuclear energy emergencies occur?
- What damage can occur from a nuclear energy emergency?
- Emergency Information.



Nuclear Energy Emergency



President Jimmy Carter (in bus) on his way to Three Mile Island
 Photographer – Frank Johnston © Copyright 1999 The Washington Post Company



Burnt homes within a mile of the Los Alamos National Laboratory (nuclear facility).
 Photographer Andrea Booher



Terrorism

- Terrorism?
- When and where does terrorism occur?
- What damage can occur from terrorism?
- Emergency Information.



This slide shows the Oklahoma City bombings, which followed with the conviction of an American citizen for the crime. Emphasis on this tragedy can direct the conversation toward how terrorism is difficult to predict and is not simply an issue between nations but can be about internal disagreements as well. Such is the nature of terror, the unpredictability makes it unique compared say to flooding. While it can't be predicted, the time line can be narrowed and mitigation can be addressed by the public. Mitigation of terrorism is a public policy issue of greater complication.



A thunderstorm is formed from a combination of moisture, rapidly rising warm air and a force capable of lifting air such as a warm and cold front, a sea breeze or a mountain. All thunderstorms contain lightning.

Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt."

While thunderstorms and lightning can be found throughout the United States, they are most likely to occur in the central and southern states. The state with the highest number of thunderstorm days is Florida.

'Just good to know' information; yes, lightning can and does strike multiple times in the same location. People rarely survive one strike, let alone more!

Terrorism



1995 bombing of the Murrah Federal Building in Oklahoma City.
Photography – FEMA News Photo



1993 - The bombed underground parking garage of the World Trade Center.
Photography – Associated Press
<http://www.emporis.com/en/bu/sk/wt/up/cb/>

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Thunderstorms and Lightning

- Thunderstorms and lightning.
- When and where do thunderstorms and lightning occur?
- What damage can occur from thunderstorms and lightning?
- Emergency Information.

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Thunderstorms and Lightning



Lightning strike in an urban area.
Photography – NOAA News Service



Thunderstorm and lightning in a forest.
Photography – NOAA News Service

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A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm (or sometimes as a result of a hurricane) and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly.

Tornado season is generally March through August, although tornadoes can occur at any time of year. They tend to occur in the afternoons and evenings: over 80 percent of all tornadoes strike between noon and midnight.

A **tornado watch** is issued by the National Weather Service when tornadoes are possible in your area. Remain alert for approaching storms. This is time to remind family members where the safest places within your home are located, and listen to the radio or television for further developments.

A **tornado warning** is issued when a tornado has been sighted or indicated by weather radar.

This slide is an excellent example of mitigation. The couple from Battlefield MO survived even though their home was destroyed. There is information about the structural requirements of a safe room and directions for building one on the FEMA.gov web site.



Tornadoes

- Tornadoes.
- When and where do tornadoes occur?
- What damage can occur from a tornado?
- Emergency Information.



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Tornado Infrastructure Damage



Public Utilities
Photographer - Win Henderson



Damage to roads and business area
Photographer - Win Henderson



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Tornado Safe Room



Bank vault as a safe room in Tuscaloosa, AL after F-4 Tornado. Photographer - Jason Pack



Tornado damage surrounds the safe room used by this couple in Battlefield, MO
Photographer - Adam DuBrowa



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A tsunami (pronounced “soo-nahm'ee”) is a series of waves generated by an undersea disturbance such as an earthquake. From the area of the disturbance, the waves will travel outward in all directions, much like the ripples caused by throwing a rock into a pond. The time between wave crests may be from 5 to 90 minutes, and the wave speed in the open ocean will average 450 miles per hour.

The major Tsunami that struck Indonesia in the early 2000's brought this force of nature to worldwide attention. Many communities on shorelines took advantage of the public's attention to the issue and conducted community training drills.

This slide highlights the tsunami that struck Hawaii in the 1960's. An earthquake in Chile generated it.

This slide is animated. Instructors should be aware it will come up in four phases, the photo left first, then the red circle on the left photo. Then the right photo followed by the red circle on the right photo.

It shows how the shoreline changed by using a grove of trees (circled in red) as a vantage point. The slide shows how 11 and-a-half feet of shore was reclaimed by the ocean as a result.

Tsunami

- Tsunamis.
- When and where do tsunamis occur?
- What damage can occur from a tsunami?
- Emergency Information.

Tsunami



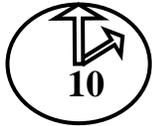

1960 Tsunami in Hilo Hawaii. Generated from 8.6 earthquake in Chile. At land the earthquake movement was 9.5, killing 61 people. 537 buildings destroyed, damages in the millions. Photo: Pacific Tsunami Museum Archives - The Kohenen Collection and the Martin Polhemus Collection

Tsunami




Views of the Halape Hawaii coast before and after the 1975 quake and tsunami. Notice the coconut grove standing in the sea as a result of the 11.5 foot subsidence of the shoreline.

"Before" photo courtesy of D. Reeser, National Park Service (Nov 1973)
 "After" photo courtesy of P.W. Lipman, Hawaii Volcano Observatory (Dec 1975).



A volcano is a mountain that opens downward to a reservoir of molten rock below the surface of the earth. When pressure from gases and the molten rock becomes strong enough to cause an explosion, eruptions occur. Gases and rock shoot up through the opening and spill over, or fill the air with lava fragments.

In the United States, volcanic eruptions are most likely in the Pacific Rim states of Hawaii, Alaska, Washington, Oregon, and California. The chance of eruptions that could damage populated areas is the greatest for the active volcanoes of Hawaii and Alaska.

The United State Geological Survey web site has excellent photographs that detail the explosion of Mt. St. Helens in greater detail that the six slides in this section.

As you display these slides keep in mind that you should describe them in detail for participants with sight limitations. Instructors can describe the shape of a triangle and how a volcanic eruption can blow off the tip of the triangle. This can act as good learning device for blind or partially sighted students. It is also a good practice exercise for the disaster communication unit. In that unit participants are asked to use communication techniques that are not their primary form of communication.

Volcano

- Volcanoes.
- When and where do volcanic eruptions occur?
- What damage can occur from an eruption?
- Emergency Information.



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Volcano



Mt. St. Helens, WA. Before the big eruption in 1980
Photograph – United States Geological Survey.



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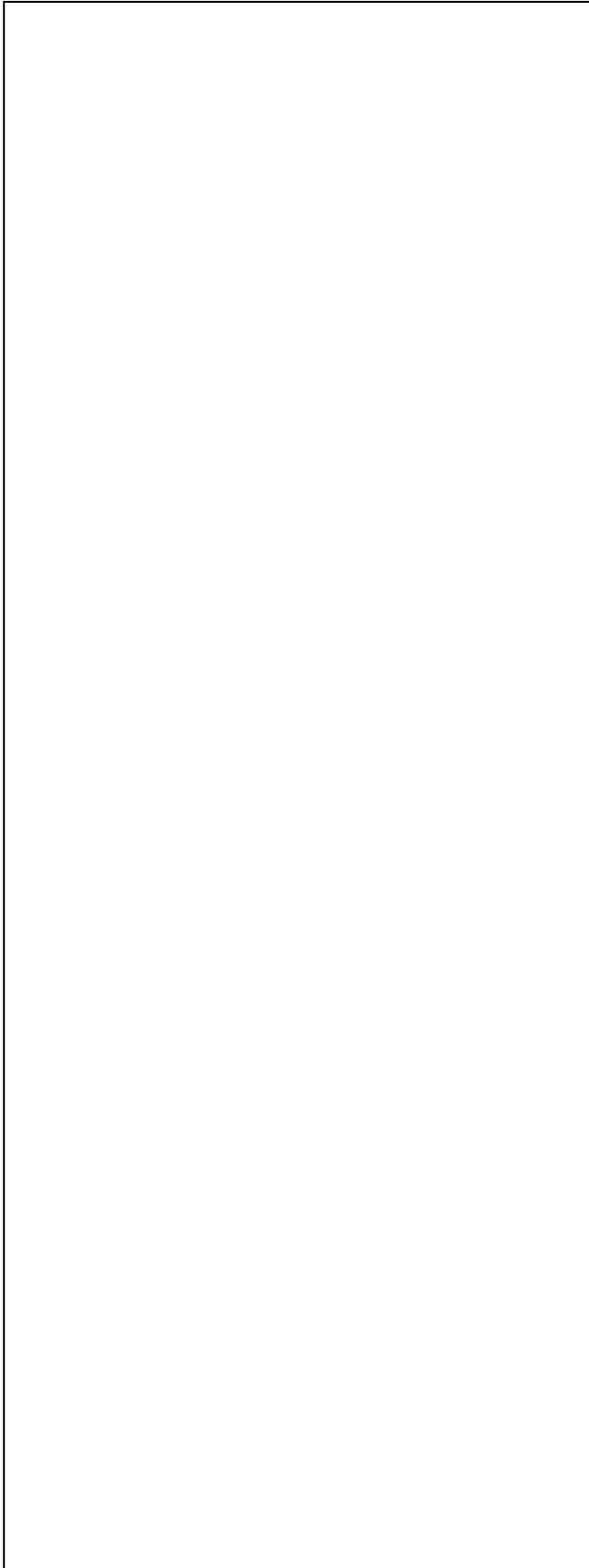
Volcano



Mt. St. Helens, WA. Phreatic eruption begins, Spring 1980
Photograph – United States Geological Survey.



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Volcano



Mt. St. Helens, WA.
eruption Spring 1980
Photograph –
United States Geological Survey.



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Volcano



Mt. St. Helens, WA. Debris flow. Spring 1980
Photograph – United States Geological Survey.



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Volcano



Mt. St. Helens – Post eruption, 1980
Photograph – United States Geological Survey.



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Three fundamental elements of a winter storm include: watches and warnings, wind chill factors and blizzard conditions.

"Wind chill" is a calculation of how cold it feels outside when the effects of temperature and wind speed are combined.

Winter Storm Watches and Warnings – A winter storm watch indicates that severe winter weather may affect your area. A winter storm warning indicates that severe winter weather conditions are definitely on the way.

'Just good to know information' a cold winter storm can freeze soap bubbles so fast that as they are blown from a bubble wand they crash to the ground. Hey, you need to keep entertained during a winter storm somehow!

Volcano

Mt. St. Helens, Spring 2005. New magma dome forming
 Photograph – United States Geological Survey.

Winter Storms

- Severe winter storms.
- When and where do winter storms occur?
- What damage can occur from winter storms?
- Emergency Information.

Winter Storms

Severe ice damage to trees during a winter storm in Missouri, 2002. Photographer – David Stonner



It is good to focus on the geographic region of the class. It can be overwhelming for participants to prepare for all hazards.

Always ask if there are questions at the end of each unit, but remember as an instructor, to ask that as you go along. Often questions are best asked and addressed in the body of your presentation when they are more topical and easy to relate to information at hand.

Identify if there is a break before the next session, how long it is, and where toilet facilities, snacks and rest areas are located.

Performance Measure All Hazards

- At each table – Identify two hazards this region of the country may be at risk to encounter.
- Describe actions to take before these hazards.
- Describe actions to take during these disasters.
- Describe actions to take post disaster.
- Present this information to the whole class.
- Time – 5 minutes to prepare,
3 minutes to present.



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