



Floods

Background

MASTERS OF DISASTER®

Floods

Floods is one topic in the series of *Masters of Disaster* materials created by the American Red Cross for schools, clubs, organizations and families across the country. *Floods* leads young people to an understanding of what causes flooding and the difference between a flood and a flash flood, as well as safe behavior before, during and after a flood.

These activities are specifically tailored for reaching children in lower elementary (K–2), upper elementary (3–5) and middle school (6–8) grades. *Floods* is divided into two sections, Flood Science and Flood Safety.

Masters of Disaster Connections

Refer to the following modules in the *Masters of Disaster* series to learn more about a particular topic and to reinforce the objectives of the lesson.

- Some floods result from the heavy rains associated with hurricanes. *Masters of Disaster Hurricanes* offers important lessons to enhance students' understanding of floods.
- An essential part of preparing for any disaster is to be ready with plans, supplies and practice. *Masters of Disaster Be Disaster Safe* inspires young people by teaching them to prepare for all hazards.
- The lessons of *In the Aftermath* focus on recovery after a disaster—for the individual, the school and the community.

Why Talk About Floods and Flash Floods?

Floods are among the most frequent and costly natural disasters in terms of human hardship and economic loss. According to the National Weather Service, over the 20-year period from 1985 to 2004, floods cost the United States an average of \$4.2 billion annually. Even more significant, floods are the number one killer related to severe weather. In that same period, the annual average of lives lost because of flood was 90 per year.

Flood Science

What Causes Floods?

Several factors contribute to floods. Two key elements are rainfall intensity and duration. Intensity is the rate of rainfall, and duration is how long the rain continues. Topography, soil conditions and ground cover also play important roles.

Floods occur due to prolonged rainfall over several days, intense rainfall over a short period of time, or an ice or debris jam that causes a river to overflow and flood the surrounding area. Melting snow can combine with rain in the winter and early spring; severe thunderstorms can bring heavy rain in the spring and summer; and tropical cyclones can bring intense rainfall to the coastal and inland states in the summer and fall. Floods can be slow- or fast-rising.



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Floods

Background

Flash floods can take only a few minutes to a few hours to develop. Most occur after intense rainfall, or after the failure of a dam or levee, or following a sudden release of water held by an ice or debris jam. Flooding can be caused by rain falling several miles upstream and then moving downstream rapidly. Heavy rain falling on steep terrain, especially recently burned hillsides, can cause flash floods or debris flows. Flash floods can catch people unprepared.

Human activity also contributes to the increase in damage due to floods. The rise in coastal development deprives the land of its natural flood deterrents. Urbanization increases runoff two to six times over what would occur on natural terrain. As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. During periods of urban flooding, rushing water transforms streets into raging rivers, while basements and underpasses can fill with water within seconds.

Flood Safety

Know the difference between WATCHES and WARNINGS

- A National Weather Service WATCH is a message indicating that conditions favor the occurrence of a certain type of hazardous weather. For example, a severe thunderstorm WATCH means that a severe thunderstorm is expected in the next six hours or so within a particular area. The Storm Prediction Center of the National Weather Service (NWS) issues such WATCHES. Local NWS forecast offices issue other WATCHES, such as those for flash flood or severe winter weather, in advance of a possible hazardous-weather or flooding event. Each local forecast office usually covers a state or a portion of a state.
- An NWS WARNING indicates that a hazardous event is occurring or is imminent. Local NWS forecast offices issue warnings on a county-by-county basis.

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

Be aware of flood hazards. Floods can roll boulders, tear out trees, destroy buildings and bridges, and erode the earth, forming new channels. Floodwater can reach heights of 10 to 20 feet, and it often carries a deadly cargo of debris. Flood-producing rains can also trigger catastrophic debris flows, or mudslides.

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



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Floods

Background

Note: Learn about floods and flash floods in your area by contacting the local emergency management office, the office of the National Weather Service (<http://www.nws.noaa.gov>) your local chapter of the American Red Cross (<http://www.redcross.org/where/where.html>) or your local department of planning and zoning. If you are at risk, take steps to reduce damage and the risk of injury or loss to your family.

What to Tell Children

- **If you come upon floodwater, stop, turn around and go another way. Climb to higher ground.** Swiftly moving water is particularly dangerous. Just two feet of water can carry away most automobiles and SUVs.
- **Stay away from flooded areas.** Even if they appear safe, floodwater may still be rising.
- **Never try to walk, swim, drive or play in floodwater.** You may not be able to determine from the surface appearance how fast floodwater is moving or see holes and submerged debris.
- **Watch out for snakes in areas that were flooded.** Floodwater flushes snakes from their homes.
- **Stay away from creek and stream banks in flooded and recently flooded areas.** The soaked banks often become unstable due to heavy rainfall and can suddenly give way, tossing you into rapidly moving water.
- **Never play around storm drains, ditches, ravines or culverts.** Water can rush downstream or rise unexpectedly, and it is very easy to be swept away by fast moving water.
- **Throw away all food that has come into contact with floodwater.** Contaminated floodwater contains bacteria and germs. Eating foods exposed to floodwater can make you very sick.

Flood Safety Checklist

What to Do *Before* a Flood Occurs

- If it has been raining hard for several hours or steadily raining for several days, be alert to the possibility of a flood.
- Use a National Oceanic and Atmospheric Administration (NOAA) Weather Radio or a portable, battery-powered radio or television for updated emergency information.
- Listen for distant thunder.
- If you are stopping your vehicle, camp or park on high ground away from streams and washes, particularly during threatening conditions.
- When in or along stream channels, be aware of distant events, such as dam breaks or thunderstorms that may cause flash floods.
- Be particularly aware of weather conditions near recently burned mountains and hillsides, where flash floods and debris flows can occur suddenly.



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Floods

Background



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What to Do During a Flood WATCH

When a flood or flash flood WATCH is issued:

- Listen continuously to an NOAA Weather Radio or a portable, battery-powered radio or television for updated emergency information.
- Everyone in a WATCH area should be ready to respond and act quickly.
- Be alert to signs of flood, and if you are in a flood-prone area, be ready to evacuate at a moment's notice.
- Follow the instructions and advice of local authorities.

If your residence is in a flood-prone area:

- Fill bathtubs, sinks and plastic bottles with clean water.
- Bring outdoor belongings, such as patio furniture, indoors.
- Move your furniture and valuables to higher floors of your home.
- If you are instructed by local authorities, turn off all utilities at the main power switch and close the main gas valve.
- Have your preassembled disaster supplies ready.
- Fill your car's gas tank in case an evacuation notice is issued.
- Be prepared to evacuate.

What to Do During a Flood WARNING

When a flood or flash flood WARNING is issued:

- Listen continuously to an NOAA Weather Radio or a portable, battery-powered radio or television for updated emergency information.
- Be alert to signs of flood.
- If you live in a flood-prone area or think you are at risk, evacuate immediately. Move quickly to higher ground. Save yourself, not your belongings.
- Follow the instructions and advice of local authorities.
- If advised to evacuate, do so immediately; follow recommended evacuation routes, and leave early enough to avoid being marooned by flooded roads.

What to Do During a Flood

- Stay away from areas subject to flood.
- If outdoors, climb to high ground and stay there.
- If you come upon a flowing stream where water is above your ankles, stop, turn around and go another way.

What to Do After a Flood or Flash Flood

- Seek necessary medical care at the nearest hospital or clinic.
- Help a neighbor who may require special assistance—infants, elderly people and people with disabilities.
- Avoid disaster areas.
- Continue to listen to an NOAA Weather Radio or local radio or television stations and return home only when authorities indicate it is safe to do so.
- Stay out of any building if floodwater remains around the building. Avoid



Floods

Background

entering ANY building (home, business or other) before local officials have said it is safe to do so.

- When entering buildings, use extreme caution.

Sources:

U.S. Geological Survey: <http://www.usgs.gov/hazards/floods>, accessed January 8, 2007

Talking About Disaster: Guide for Standard Messages. Produced by the American Red Cross in cooperation with the Coalition of Organizations for Disaster Education, Washington, D.C., 2007: <http://www.redcross.org/disaster/disasterguide>, accessed June 1, 2007.



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