



Floods 6–8

Flood Safety

LESSON PLAN 4

Flood Preparedness

It is important to plan ahead for possible floods. Learn the meanings of “flood WATCH” and “flood WARNING.” Learn about your area’s flood risk and elevation in relation to nearby streams and dams. Always check the weather before hiking, biking or horseback riding in and below mountains, in canyons and along streambeds. If rain is predicted, change your plans.

Key Terms and Concepts

crest	flash flood WATCH	flood WATCH
debris flow	flood stage	storm drain
flash flood WARNING	flood WARNING	streambed

Purposes

To prepare students and their families to be ready if a flood or flash flood WATCH or WARNING is issued

To recognize and understand important information to be disseminated to the community after a flood disaster

Objectives

Students will—

- Use the Background in the *Floods* module to create a public service campaign to educate the community about flood dangers and flood safety.
- Share the information about flood-safe communities with their families. (Home Connection)
- Create a demonstration to illustrate the added danger of debris flow during times of heavy rains and rains that follow wildfires. (Linking Across the Curriculum)
- Use *Speed of Stream Flow* to measure and calculate the speed of flow of local waterways and the amount of water at flood stage of these waterways. (Linking Across the Curriculum)
- Research to discover possible problems with drinking water after a flood and what can be done to make the water safe; demonstrate the steps to distill water. (Linking Across the Curriculum)
- Read news articles on floods and review them for thorough, accurate and helpful information; rate the media on the basis of this review.
- Read first hand accounts of a flood and write news reports on the event; share reports and critique them for thorough, accurate and helpful information.



Visit the American Red Cross Web site
at www.redcross.org/disaster/masters



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Activities

“Build a Flood-safe Community”

“Flooding News”



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Materials

- Background in the *Floods* module (1 copy per student)



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“Build a Flood-Safe Community”

SET UP 15 minutes **CONDUCT** two 45-minute classes

Science: Earth Science and Health; Social Studies: Geography and Community

1. Based on their understanding of floods, have the students make a class list of the dangers they cause.

Make sure that the class list includes—

- Rising waters can flood riverbeds and damage or destroy property.
- Rising waters can trap you in an unsafe place.
- Rapidly moving floodwaters can uproot, knock down or carry away trees, buildings and vehicles.
- At flood stage, water can break through dams and tear up bridges or roads.
- Waters can rise quickly if soil has reached its saturation point.
- Waters can inundate a floodplain, a low-lying area, a storm drain or a dry streambed in a matter of minutes or even seconds.

2. After the students have discussed the class list of the dangers of floods, distribute Background in the *Floods* module and have the class add to and amend their list. Then discuss—

- Which problems did not occur to them?

Additional dangers may include—

- The depth and speed of water are not always obvious.
- Vehicles can be swept away by floodwaters.
- Embankments may give way.
- There may be structural damage to homes and roads.
- Public utilities may be out.
- Animals may have taken refuge within structures.
- What are the scientific reasons behind each danger?
- How does a flash flood compare to a river flood?
- What is the difference between a WATCH and a WARNING?
- Are the students ever in an area that could be subject to flooding? Where? When?
- Do they know how to get to safety?

3. Based on what they know about flood, have the students discuss what actions families can take to prepare before a flood and then check the activity sheet to add to and amend their list.

Make sure answers include—

- Consider evacuation routes.
- Talk as a family about flood safety rules.



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- Prepare a family disaster supplies kit. (See *Be Disaster Safe* for detailed information.)

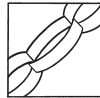


Wrap-Up

Have the students compare what they had already known about flood safety—before, during and after a flood—with what they learned in class. Do they believe others in the community need to be educated as well? As a class, think of possible ways to educate the community; these could include—

- Create and distribute flood safety information—brochures, posters and signage.
- Set up a flood safety workshop for parents.
- Work with a representative from the local cable company to produce and air a series of flood public service announcements or a flood safety program.
- Set up a series of flood safety workshops for the younger students.

Select one or two items from your class list and have student groups begin to prepare and implement the ideas.



Linking Across the Curriculum

Science: Physical Science

For this activity you will need—

- Trough
- Sand
- Debris
- Large pitcher of water
- Large pail



Write the term “debris flow” on the board. Ask the students to try to define the term. Complete the following demonstration to help the students understand the added danger of debris flow during times of heavy rains and floods. Tell students that in areas prone to wildfire, debris flows frequently occur on hillsides that have burned in the previous three to five years.

1. Have ready a trough, dry sand, debris (rocks, sticks, pieces of bark and similar items), a large pitcher of water and a large pail.

TEACHING NOTE A 2-foot (60-centimeter) piece of gutter makes a great trough, or you can make your own. Take a 1- or 2-liter plastic soda bottle and cut off the bottom and top funnel area. Cut the trimmed bottle in half lengthwise and tape the two pieces together.

2. Fill the trough with dry sand and debris and tilt the trough over the pail. Have the students observe the flow.



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3. Put the dry sand and debris back into the trough and dampen it. Now, tilt the trough over the pail once again and have the students observe the flow.
4. Finally, put the sand and debris back into the trough, and this time, cover the sand with water. Now, tilt the trough over the pail and have the students observe the flow.
5. Discuss with students the dangers of debris flow. When could they happen? Where might they happen? Could they occur in your area? Explain. What materials would comprise the debris that flowed with the mud?

Science: Physical Science; Mathematics: Calculation

Distribute *Speed of Stream Flow* and have the students (or groups of students) measure the speed of waterways around the area. Help the students compare their findings. What factors contribute to the speed of flow? (The answers to *Speed of Stream Flow* are dependent on the waterways the students measure.)

Science: Life Science and Health

Discuss with the class the problems associated with drinking water after a flood. What is the difference between boiled water and distilled water? Help the students discover the steps needed to distill water and set up a demonstration.



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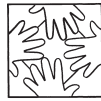
Flood Preparedness

Materials

Computers and Internet access



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"Flooding News"

SET UP 15 minutes **CONDUCT** two 45-minute classes

Language Arts: Research, Media Literacy, Writing and Vocabulary;
Science: Earth Science, Health and Technology

TEACHING NOTE If Internet access for the class is not available, assign tasks to small groups of students to complete in the media center or print reports to share with groups of students.



Some flood technical vocabulary may be difficult for your students to understand. In Step 1 of this activity, have the students underline words from the articles that they do not know. Before discussing their reading, have them use the Glossary in this module and take time to create and discuss a chalkboard list of the words they underlined.

-  Have the students research the Internet, television, radio and other media resources to find and review reports on floods in class.
 - Did the reports provide an explanation of floodwater dangers?
 - Did the reports explain why a flood was occurring?
 - Did the reports communicate ways to stay safe during a flood?
 - Did the reports act as a warning to others?
 - Did the reports help young people understand the dangers or did they reach only adults?
 - Did the reports provide resources for safety and insurance information?
2. Following the review discussion, implement a class survey to rate the media on flood education. Did they think the reports were complete and helpful? Why or why not?
3. Challenge students to read the firsthand reports on floods found at the Federal Emergency Management Agency's site, FloodSmart.gov. Click "Prepare"; under Know the Facts: Learn More, select Real Encounters.
4. Have the students choose one of the eight accounts and write a news report about the actual flood. Any information they need to make their articles complete can be found at the Press Room in lower left of the home page.



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Wrap-Up

Have the students present their reports and critique and rate each other's reports. Discuss—Why is it important for news articles about disasters such as floods to include the information described in Step 1 above?



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Speed of Stream Flow

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Name _____

Caution: This activity must be done with an adult. Be sure to check the weather forecast and weather conditions before doing this activity.

Directions: You can test the speed of flow of a stream in your area with just a few simple items:

- Several oranges
- Stream of water
- Tape measure
- Stopwatch or watch with a second hand
- Pencil

What to do—

1. Measure and mark a specific distance alongside the stream.
2. Drop an orange upstream and start timing.

Start time: _____

3. When the orange reaches your measured length, stop timing.

End time: _____ Distance traveled: _____

4. Repeat steps 1, 2 and 3 several times over different stretches of the stream.

What is the **highest** speed of flow? _____

What is the **lowest** speed of flow? _____

What might account for the differences? _____

What is the **average** speed of flow? _____

5. Calculate your **average rate of flow** for the stream. _____

Mathematical Note:

Water flows fastest near the surface because it has less friction from the bottom of the streambed. To get a good average speed for the entire depth of the stream, multiply your answers by 0.8. For example, if you find that the orange moved 100 feet in 25 seconds, the speed of flow would be 4 feet per second. Multiply this by 0.8 and the average speed of flow would be 3.2 feet per second.

