

## What to do if there is a flood:

- ◆ If there is a flash flood, move out of the waterway and low-lying areas and get to higher ground immediately.
- ◆ If you are in a car, stay off bridges or roads underwater. Do not drive through a flooded area. It takes only 18 inches of water to carry a vehicle away.
- ◆ If you are walking, do not try to cross through any flooded water even if it looks shallow. Water can be moving a lot faster than you think. If the water is over your ankles, turn around and go the other way.
- ◆ Stay away from power lines and electrical wires, as electricity travels through water.
- ◆ If you are at home, turn off the electricity and gas in your house.
- ◆ Flood water can be contaminated with sewage and hazardous chemicals. Do not eat or drink anything that has contacted flood water.

### Preparation: Ask questions, learn answers:

**How bad could a flood be on my property?** How high would the 100-year flood be in my neighborhood? Would we expect fast-moving water? What streets are likely to be flooded in my neighborhood? These questions can be answered by going to the Boulder County Flood Protection Handbook [http://www.co.boulder.co.us/transportation/pdf\\_files/fld\\_protect.pdf](http://www.co.boulder.co.us/transportation/pdf_files/fld_protect.pdf)

### How will I get a flood warning?

Listen for public emergency sirens.

In the Boulder area, here are the local places to tune in to a flood warning:

AM radio stations 850 KOA  
FM radio stations 98.5 KYGO  
TV broadcast stations 2,4,7,9  
TV cable station 8

### What do the different flood warnings mean?

Flood Watch or Flash Flood Watch - Flooding may happen soon, stay tuned.

Flood Warning - Flooding may happen very soon, prepare to evacuate area.

Flash Flood Warning - Flash Flood is happening, get to higher ground immediately.

### What other things can I do to prepare for a flood?

Purchase a water alarm to let you know if flooding is occurring in your home.

Prepare a list of emergency phone numbers. Make a flood response plan, which includes a meeting place for family members away from the flood area. Assemble supplies needed for clean-up and recovery. Samples of these and other information can be found in the Boulder County Flood Protection Handbook.

### FLOOD TIP:

Find out if your home is located in a flood plain.  
Call (303) 441-1880 or go to [www.naturalhazards.net](http://www.naturalhazards.net).  
Or, go to [www.fema.gov/kids/floods](http://www.fema.gov/kids/floods)  
for more kid-friendly flood facts.



## Unit 4:



# Flood Forces

## (Special Teachers' Guide)

### Type of Activity:

In class group activity

Group presentation

In class discussion

### Classroom Time:

45 minutes

### Printed Materials:

Flood Forces student activity sheet

### Standard 4: Strand 4.3.

Students know major sources of water, its uses, importance, and cyclic patterns of movement through the environment.



### Lesson Objectives:

- ◆ Understand potential flood risk in Boulder County and surrounding areas.
- ◆ Learn what a 100-year flood is.
- ◆ Stimulate group critical thinking about flood safety decisions for both children and parents.
- ◆ Identify things we can all do to prepare for floods and flood dangers.

### Activity Procedure:

There are two parts to this activity:

1. Student Flood Forces student activity sheet.
2. In class group work, presentation and discussion.

## Activity Directions:

**Hand out** the Flood Forces student activity sheet. Five possible flooding scenarios will gauge students' flood awareness. Divide the class into five groups and assign each group a scenario. Have them brainstorm as a group about what decisions should be made. After a 5 minute discussion, have one person from each group explain the scenario and describe the conclusion the group came to about the actions that should be taken. See if the rest of the class agrees with their conclusions and correct any misconceptions. Do this with each of the five groups.

**Discuss** the potential flood risk in Boulder and its surrounding areas. Clarify the difference between flash floods and general floods and how each are caused. Explain what a 100-year flood is and how flooding is a risk if your home is in a 100-year flood plain. Discuss some of the things students and their parents can do to prepare for a flood.

**After** the scenarios and the class discussion, the students are ready to take on the WBI Agent Action Assessment side of the Flood Forces student activity sheet. Have students work alone to answer T/F statements about floods and flood safety. After 10 minutes, discuss each correct answer with the students.

## Activity Answers:

### Critical Decision Scenarios

Scenario 1 answer

Climb to safety immediately. Moving as little as 10 feet higher than where you are can make all the difference. Flash floods can come extremely quickly - seconds count, so leave all personal belongings. Do NOT try to outrun a flash flood either on foot or in a vehicle. Do not walk in floodwaters. If the water is over your ankles, turn around and go the other way. Never drive in floodwaters. It takes only 18 inches of water to carry a vehicle away.

Scenario 2 answer

Never drive in flood waters. Turn around and go home via an alternate route. It takes only 18 inches of water to carry a vehicle away—you are vulnerable to further flood hazards.

Scenario 3 answer

Do not eat or drink anything that has contacted flood water, it can be contaminated with sewage and hazardous chemicals. Do not walk through the water in your basement either. Immediately go inform your parents that there is water in the basement. They should turn off the gas and electricity going to the house and tune-in to local stations for flood warnings.

Scenario 4 answer

Go back to school and call your parents to make a plan. Do not walk in flood waters. Even 6 inches of water can knock you over. Debris in flood water can be extremely dangerous both as a hazard to people, and as a way to further block waterways and worsen flooding.

Scenario 5 answer

A Flood Warning means flooding may happen soon and you should be prepared to evacuate your home. Contact your sister at her friends house and if she is in a safe area she should stay put. Your parents should make a plan to meet her if necessary. Follow your flood response plan, which includes a meeting place for family members away from the flood area.

## Background Information for Class Discussion:

### Flooding happens in the Boulder County area:

Floods are the most common and widespread of all natural disasters—except fire. People don't normally think of flooding in the Boulder County area, but it can happen after spring rains, heavy thunderstorms, or winter snow thaws. Although flooding normally occurs in the spring, flooding can happen any time of the year and can happen in any area when there is too much water on normally dry land.



The last 100-year flood in Boulder occurred in June of 1894 and took out every bridge in Boulder Canyon. Water stretched up to a mile wide in some places. In July of 1976, the Big Thompson Canyon Flash Flood killed 139 people.

### Flash Floods vs. General Floods:

Floods that happen very quickly are called flash floods. They occur in creeks and canyons with a mountainous upstream water source. When enormous amounts of water from rain or runoff cannot sink into the ground fast enough, stream or creek beds fill up and overflow quickly.

With flash floods, it is vital to move to higher ground immediately; there is no time to stop for personal belongings. Flash floods can come at you as a high wave of water and are powerful enough to uproot trees and wash out roads and bridges. They can even happen in low spots in cities and suburbs. General floods happen when heavy rain falls over an extended period of time causing slow-moving water to flood a neighborhood. In both cases, floods can carry a lot of debris, including branches, boulders, toys, firewood, fuel tanks, tools and vehicles. Debris worsens floods by blocking waterways and can be an additional hazard to people.

A **100-year flood** is a very large flood that has a 1% chance of occurring in any given year. It takes only 5 inches of rain over a few hours to trigger a 100-year flood. A 100-year flood does not happen once every 100 years, but can occur more than once in a relatively short period of time.

## Activity Answers: WBI Agent Action Assessment

1. T
2. T
3. F
4. F
5. F
6. T
7. T
8. F
9. F
10. F