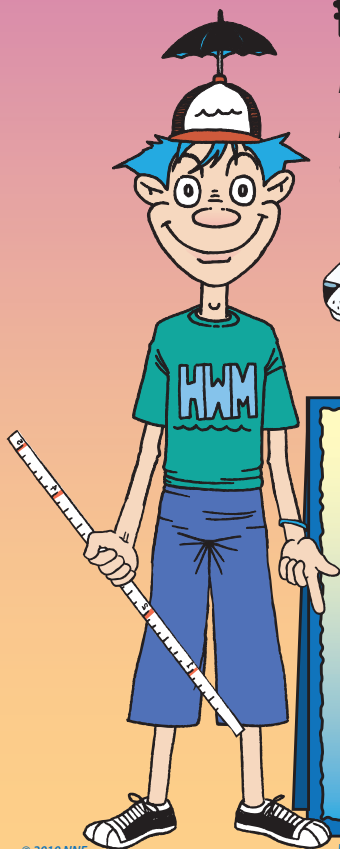


Floods Happen. Lessen the Loss.

Loss of life and property to flooding is the most common, yet preventable, natural disaster in the United States. The following worksheets were developed to increase the understanding of flooding and flood safety for students, educators, and others. Each of the six sheets develops basic flood information and safety themes that appear in the Flood Education Poster. The characters, **Highwater Mark** and his dog, **Noah**, lead the way! Answers to puzzles on last page.



"Floods Happen. Lessen the Loss" is a project of the Nurture Nature Foundation. NNF is a non-profit organization working with the National Oceanic and Atmospheric Administration and its National Weather Service offices to present a comprehensive, replicable flood education campaign. The campaign offers general flood education messages and focuses especially on increasing the use and awareness of flood forecasting tools developed by NOAA/NWS.

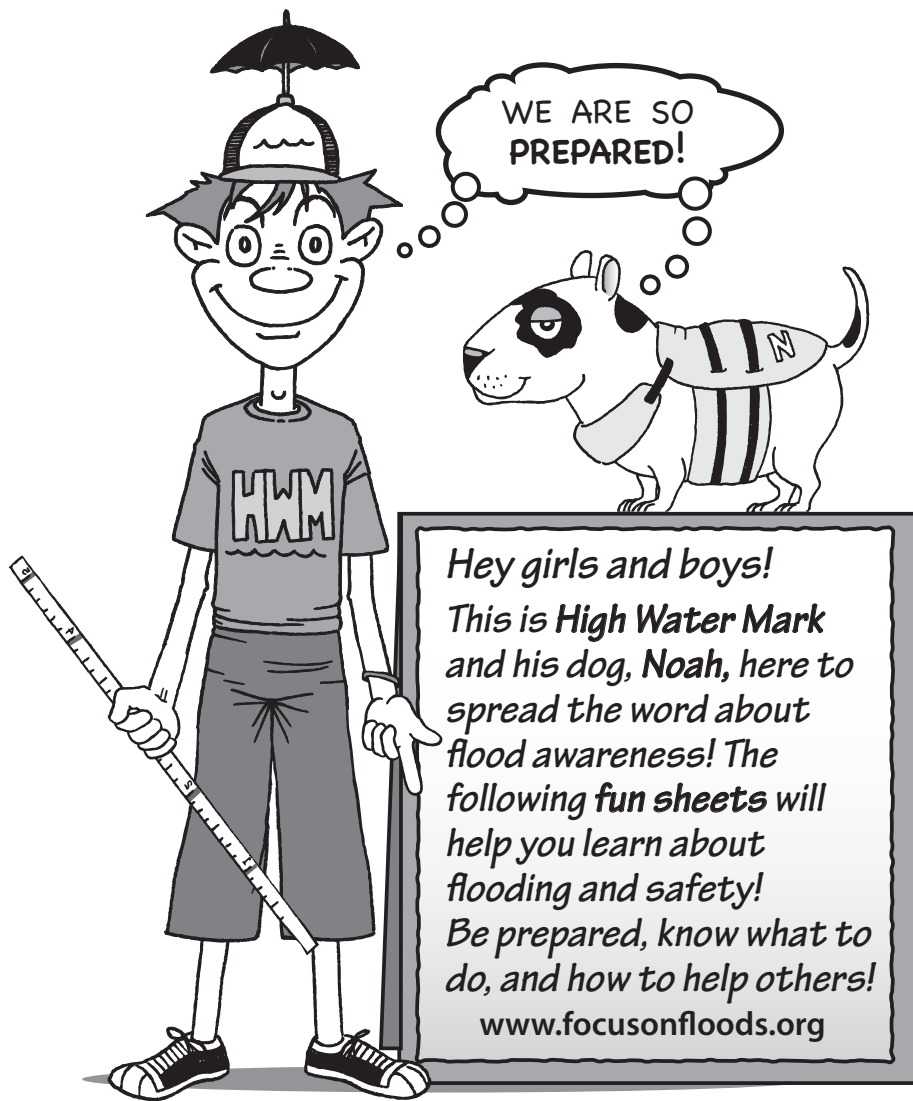
THE
NURTURE
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FOUNDATION

For more information, contact: Nurture Nature Center
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610-253-4432 www.nurturenaturecenter.org

www.focusonfloods.org



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Floods Happen!

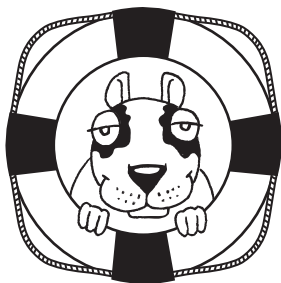
Flooding is the nation's most common, costly and deadly natural hazard -- and it is also a natural part of the river's processes, serving to improve water quality and provide essential habitat to species among other benefits. Floods occur during or after heavy rains, when snow melts too quickly, or when dams break. At these times, rivers may overflow their banks, and local culverts and ditches may overflow and become dangerous. Floods that happen quickly are called *flash floods*.

Flooding may be only a few inches of water or it may cover a house to its roof. However, even the smallest of floods can be dangerous if you are not prepared. It only takes a few inches of flood water on a road to carry away even large vehicles. The best rule to follow is "Turn around, don't drown."™

The term "flood zone" indicates an area that is at risk of flooding. It is important to determine whether you live, travel, or go to school in a flood zone. The following fun sheets will help you identify flood zones in your community and help you to take steps to prepare and be safe.

Explore the info below and find out what "watersheds" and "floodplains" are!

Noah says: "Know your Flood Words"



1. **Watershed** - an area of land drained by creeks, streams, and/or rivers. Like a giant bowl, land in a watershed gathers water that flows downward. This includes land that catches rainfall.

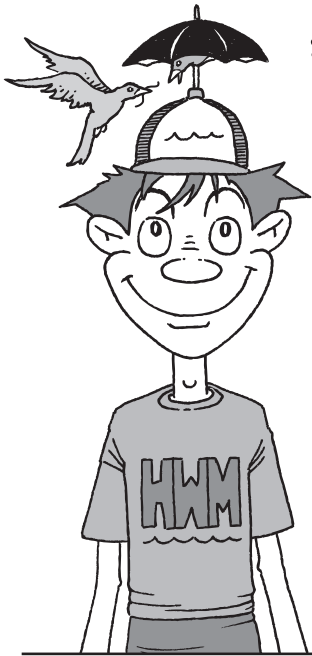
2. **Floodplains** - usually flat areas along creeks, streams, and rivers that are covered in water during floods and help to lessen the damage caused by flooding.

What watershed do you live in? Do you live in a floodplain?

Flood Facts:

- According to the National Weather Service, over the past 20 years, flooding in the U.S. has cost an average of 4.2 billion dollars annually.
- Flooding is the number one severe weather threat to humans.
- Flooding occurs naturally and vegetated areas help to soak up and slow down flood water.

- Human activity contributes to the increase in damage due to floods. Development clears the land of its ability to soak up and hold flood waters.
- Development increases runoff two to six times over what would occur on natural, undisturbed land.
- Flooding may occur in an area not experiencing rainfall. Heavy rain upstream may cause flooding downstream where there may be good weather!
- Floods can happen in any state in the United States, even in the desert!



Floods are Natural

Rivers and streams overflowing their banks is a natural process that can be beneficial to land and water. Floods leave behind rich nutrients that improve the soil.

Natural growing areas along streams and rivers can act like a sponge, soaking up and slowing down floodwater. Allowing natural space for floods to flow upstream can prevent greater flooding in areas downstream.

A natural wet area that holds water is called a **wetland**. Wetlands allow the flood water to spread out. Swamps, marshes and bogs are all forms of wetlands. Wetlands are very

special places because the soils and plants they contain help to clean the water.

Many animals depend on these areas for food and shelter. Wetlands are home to frogs, toads, salamanders, turtles, birds, fish, insects and many, many more! Areas left natural along streams and rivers also provide a home for many animals like deer, foxes, squirrels ...and rabbits!



For humans, living in the path of a flood can be a disaster. Nature gives us ways to slow flooding. The plants that grow along waterways and other natural areas like wetlands should be preserved whenever possible.



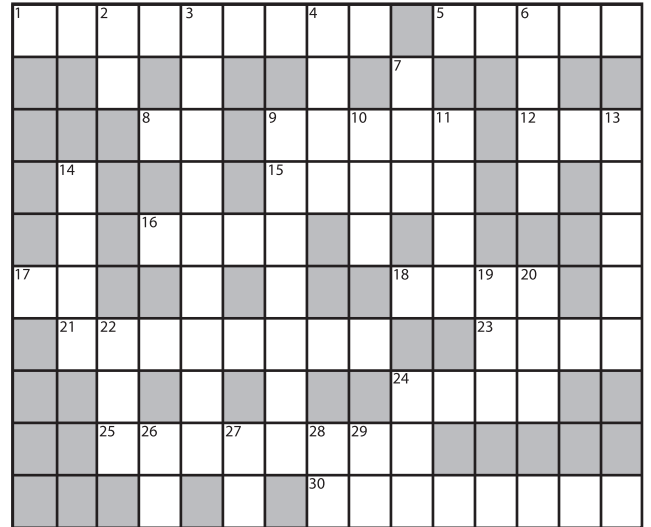
CROSSWORD PUZZLE - Discover the answers about nature, floods, and more!

ACROSS

1. Mark's first name.
5. The Delaware ____.
8. Eleven in Roman Numerals.
9. Creatures of the air.
12. A parent's male child.
15. The vowels.
16. A North American mammal with antlers.
17. He, she, ____, pronouns.
18. Mark's dog's name.
21. A white, shaggy flood plain tree.
23. A type of precipitation.
24. The opposite of right.
25. Animals on the loose!
30. When rivers overflow their banks.

DOWN

2. A ____ Kit, flood preparation.
3. A type of deer in the Eastern U.S.
4. A Great Lake.
6. Noah wears a life ____.
7. What you say when you get married (two words).
9. A type of night bird that nests in trees (it's pictured on sheet 4!).
10. The Spanish word for "river."
11. A type of Japanese wrestler.
13. Opposite of a good time (two words).
14. Flying creatures of the night.
19. What dogs say.
20. What Mark's umbrella is attached to.
22. A type of evergreen tree with red berries.
24. The lion constellation.
26. She either ____ or isn't.
27. Abbreviation: Drill Instructor.
28. A two-letter word that rhymes with "sniff."
29. Abbreviation: Southern state that has plenty of sun and the Everglades.



Flood Facts:

- The ancient Egyptians relied on the rich soil in flooded areas to grow their crops, and many cultures continue the practice today .
- One acre of wetland can typically store a million gallons of water!
- Wetlands are important water storage areas that can also help prevent drought conditions by slowly releasing water during dry periods.
- Wetlands along the ocean's coast are particularly helpful because they also aid in buffering and reducing damage from powerful storms like hurricanes.

Flood-Wise Activity: The holding power of wetlands.

Materials needed: sponge, water.

Small pockets within the soil hold water, much like the holes in a sponge. Wetlands that allow flood water to spread out can hold a lot of water.

Try this experiment: thoroughly soak a sponge and hold it flat in your hand. Allow the extra water to drain away. Now, turn the sponge vertically. Notice how much extra water drained out! How is it that the same sponge can hold less water when turned on it's side? What role does gravity play?



All this talk about water is making me thirsty! Arf!

For more information,
visit www.focusonfloods.org

Floods happen. Lessen the loss.

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Get Flood Alerts!

The National Weather Service has tools available that will help to warn you if a flood is expected. **High Water Mark** watches his favorite weatherman on TV, but listens to his battery-powered NOAA radio to hear the latest flood watches and warnings when the weather is rainy. You can also sign up for flood alerts on the computer. All of these tools can give you advanced warning if a flood is expected and time to prepare to be safe.

It is important to know the difference between watches and warnings. A **Flood Watch** means that a flood may be on the way. You should listen for more alerts and be prepared to take steps to safety if things get worse. A **Flood Warning** means that a flood is coming or happening right now. Communicate with adults around you and take steps to be safe.

Floods can come quickly or slowly, but by listening for watches and warnings, we can gain valuable time to get prepared by moving to a safer place, packing a safety kit and communicating with others.

Flood Facts:

- A **flash flood** is the fastest moving type of flood. They are most often caused by heavy rain that quickly collects in a stream or ditch.
- Flooding can happen in any state in the United States.
- Stream "gages" are instruments used to measure river levels.

For more information and to sign up for flood alerts, visit www.focusonfloods.org

Can you find the hidden words?

The words may be hidden in any direction: horizontally, vertically, diagonally, and forwards and backwards. Find them all and the remaining letters will spell out an important message!

S A N D B A G N I N R A W F
 A C R I V E R O F D L S O L
 F L O O D S T A G E E T O O
 E I E M D I N A G E T O H O
 T S R R M A P R E P A R E D
 Y T F E T U A A P P U M P P
 K E I T H I N D A M C E N L
 I N S A N T T I D E A E S A
 T F H W L E A O C S V S E I
 N L B R I D G E T A E H E N
 D E H S R E T A W A T C H L
 R E S C U E O S L E V E E S

- | | | | |
|-------------|-------------|------------|-----------|
| alert | flee | prepared | tide |
| bridge | floodplain | rain | warning |
| communicate | flood stage | rescue | watch |
| dam | levee | river | water |
| deep | listen | safety kit | watershed |
| evacuate | map | sandbag | wave |
| fish | NOAA radio | storm | weather |

Message:



Flood-Wise Activity: What's Your Number?

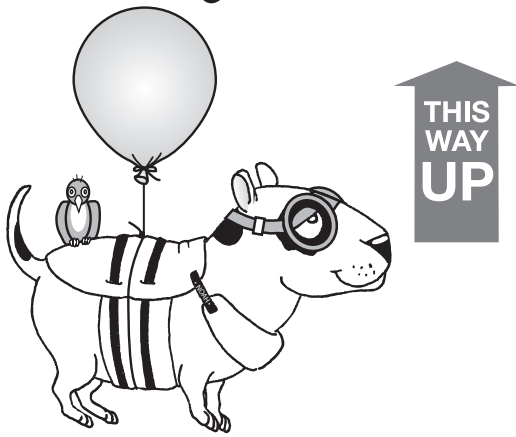
Knowing your river's flood stage is the first step in flood preparedness. Flood stage is the height at which the water flows over streambanks and begins to fill surrounding areas.

What are the rivers or streams in your area? You can look for your nearest stream gage and the flood stage number by visiting the National Weather Service website at <http://water.weather.gov/ahps/> Keeping an eye on the river level and knowing your flood number will help you become flood-wise!

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Go to Higher Ground



Stay away from flood water. If you are outdoors during a flood, climb to higher ground. Always look for an adult and tell others where you're going. If your family is asked to evacuate your home during a flood, always drive towards higher ground and AWAY from flood waters. If a road is flooded, turn around.

Even shallow floods can have enough force to carry away big objects like cars and trucks.

Heavy rain can cause water to quickly collect in a stream or ditch. This is called a **flash flood**. This is the fastest moving type of flood and can surprise people.

*Remember,
higher ground
is safer ground!*

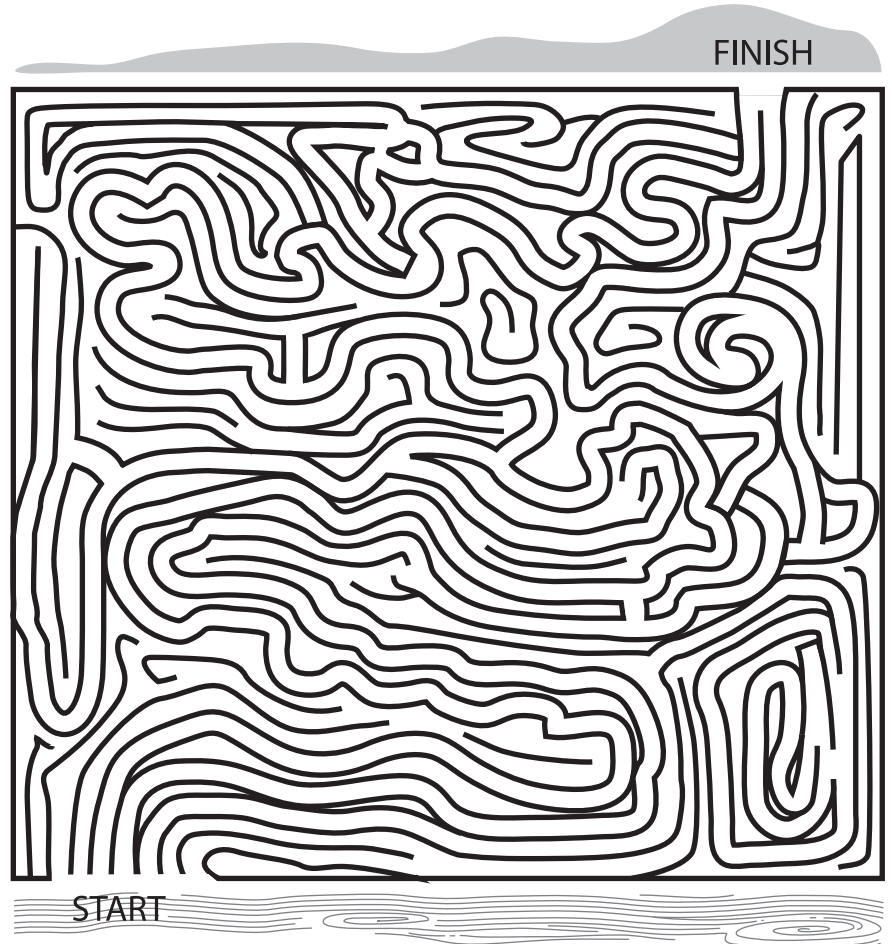


Flood Facts:

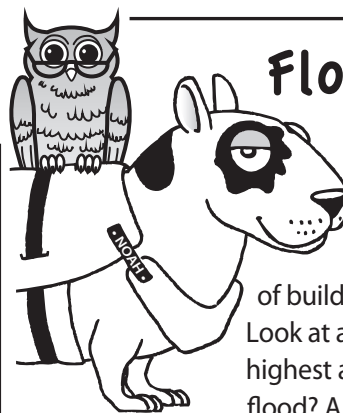
- Flash floods can occur within a few minutes or a few hours of rainfall.
- Fast melting snow or rain on frozen ground can also cause areas to flood quickly.
- Rain water flows faster off of steep areas and areas covered by concrete, asphalt or buildings.
- Staying away from any flood waters is the most important thing you can do!

For more information about flood safety, visit www.focusonfloods.org

Find your way through the maze to safety and Higher Ground!



Plan a safe route to higher ground ahead of time so you know where to go during a flood.



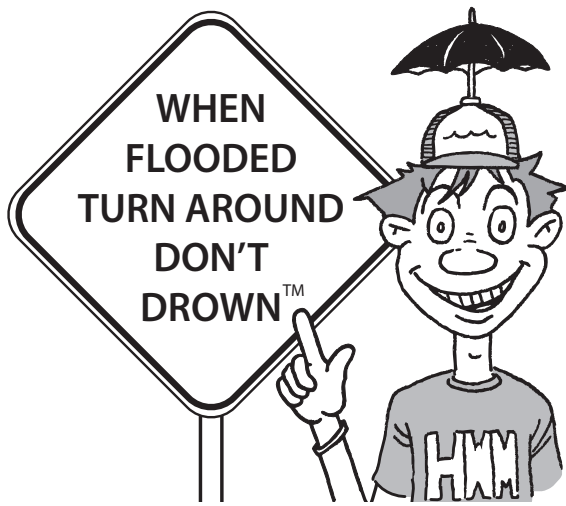
Flood-Wise Activity:

Topography is the study of the earth's surface shape and features. What is the topography like where you live? Are there mountains, hills or valleys? Are there a lot of buildings? Where are the rivers and streams? Look at a map of your town and find where the highest areas are and where the lower areas might flood? A map that shows these features is called a *topographic map*. These maps are used by scientists to help predict where floods might occur. Can you draw a map of your area showing hills, valleys, streams and buildings near you?

Go to www.focusonfloods.org and click on "Flood Zones" for help in finding a flood map of your area.

Floods happen. Lessen the loss.

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Floods are strong! They can carry away cars, trees, houses and even bridges! High Water Mark says, "Stay away from flood waters and do not walk or play near storm drains or ditches."

Even a little flood water can have the strength to knock over an adult. This powerful water can weaken and knock down walls and streambanks. Kids need to stay far away from moving water!

Tell an adult never to try to drive through flooded areas. Creeks and rivers can flood really fast and the road bottom can also wash away making the water much deeper than it appears. Driving through flooded areas is dangerous. Take the safest route to higher ground.

Flood water also is very polluted. Moving water picks up dirt, garbage... anything in its path. Even after the waters go away, there is still danger because harmful bacteria can remain on things touched by the flood water. These items must be carefully cleaned.

Flood Facts:

- It only takes six inches of fast-moving flood water to knock over an adult.
- Most cars will float (and be swept away) in 18-24 inches of moving water. Trucks and SUVs are not much better with only 6-12 more inches of clearance.
- Turning around and staying away from any flood waters is the most important thing you can do to save lives!

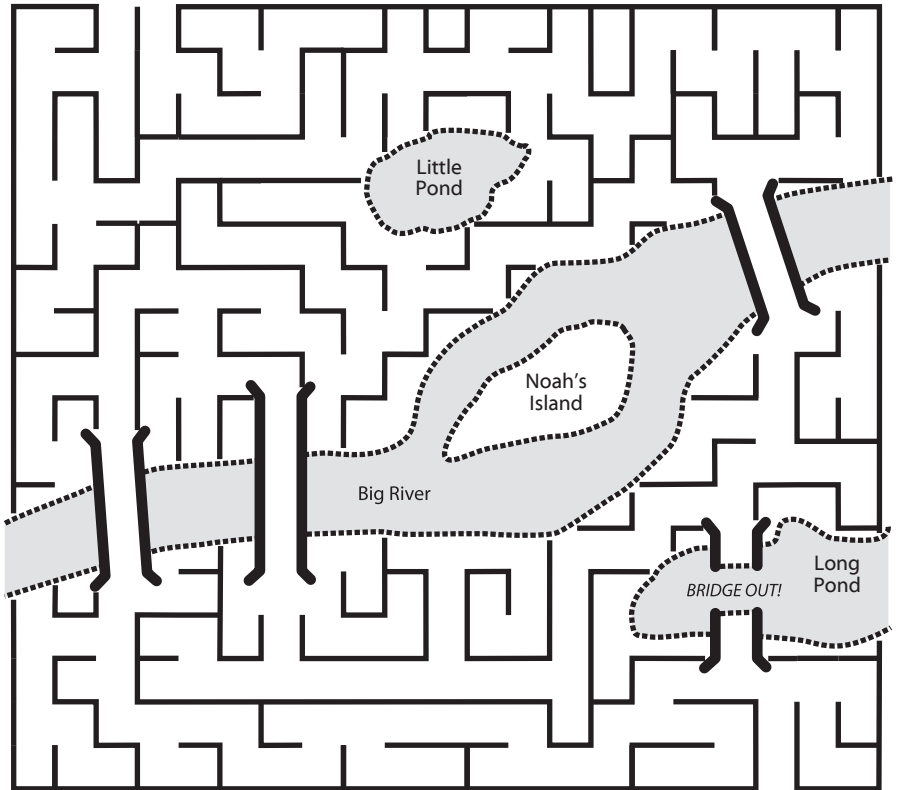
For more information about flood safety, visit www.focusonfloods.org

Can you find your way home through the flood maze?



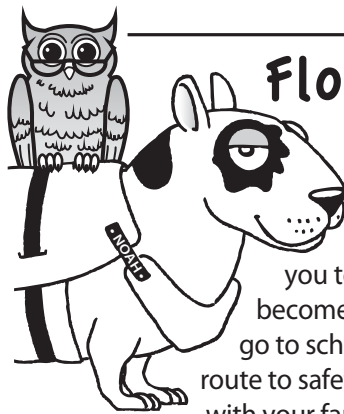
START

Avoid the flooded areas and cross the bridges to get home safely!



FINISH

Be prepared! If your way home goes through flood areas, have an adult help you plan a safe route home.



Flood-Wise Activity:

Have an adult or your teacher help you locate your home on a map of the area where you live. Can you find your school? Where is the nearest river or stream? Can you tell what areas and roads are most likely to become flooded when it rains? If you live, play or go to school in a flood-prone area; plan another route to safety on higher ground. Draw a map to share with your family members and friends. If you live in a flood plain, pick a safe place to meet with your family and put it on your map.

Go to www.focusonfloods.org and click on "Flood Zones" for help in finding a flood map of your area.

Floods happen. Lessen the loss.

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Plan Ahead and Be Ready for Floods



Working with your family and friends to create a flood plan is a smart thing to do!

If you live in an area that floods, you should have a flood plan. With a little preparation and a written plan, you can help your family be safe and to protect the things you care about... like your dog!

A flood plan can be just one page, but it contains all the important information your family needs to be ready for a flood. It can include an evacuation route, a safe place

away from the flood for the family to meet if they are separated and phone numbers of family members. It can also have a list of what needs to be moved upstairs and away from expected flood water. Photographs and computers are examples of things that should be moved upstairs or taken with you. Preparing a checklist beforehand will help everyone remember what they should do.

You can also make a family emergency or "Go-kit" with things you should have with you. A kit might contain first-aid supplies, drinking water, food, a flash light with batteries, a radio and extra clothing.

Which four items don't belong in your family "Go-kit?"

- | | | |
|---|-------------------------|---------------------------------|
| First Aid Kit | Family Photographs | Whistle |
| Extra Clothing and Blankets | Computer Files Backup | Popsicle |
| Large Plastic Bag for Warmth or Protection | Light Stick | A Map of the Area |
| Non-perishable Snack /Food and Can Opener | Couch | Copies of Identification |
| Canned Pet Food | Small Toy | Cash and Coins |
| Water (one gallon for each person each day) | Last Week's TV Guide | Flashlight with Extra Batteries |
| Swim Suit | Emergency Phone Numbers | Soap, Toilet Paper, Toothbrush |
| Radio and Extra Batteries | Hand Wipes | Eyeglasses and Medicine |



Things I would add to my "Go-kit:"

Flood-Wise Activity:

Begin your own family flood plan.

On a piece of paper, list important emergency numbers to get help and numbers to contact your family with.

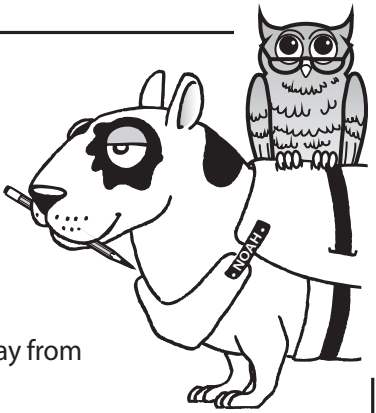
Ask your parents to choose a friend or family member out of town to call in an emergency. Learn this number by heart.

Make a list of things in your house that should be moved away from flood water.

Create your own family "Go-kit". Fill a bag or container with things you can use in an emergency.

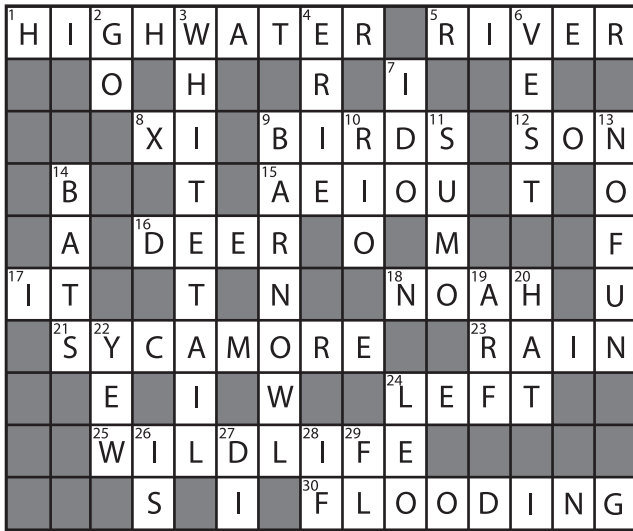
Decide where to meet your family. Choose a meeting place outside your home or in a flood-safe place outside your neighborhood. Find alternative routes away from any flood prone roads.

Make a copy of the flood plan for each family member to keep.



ANSWER PAGE

Floods Are Natural

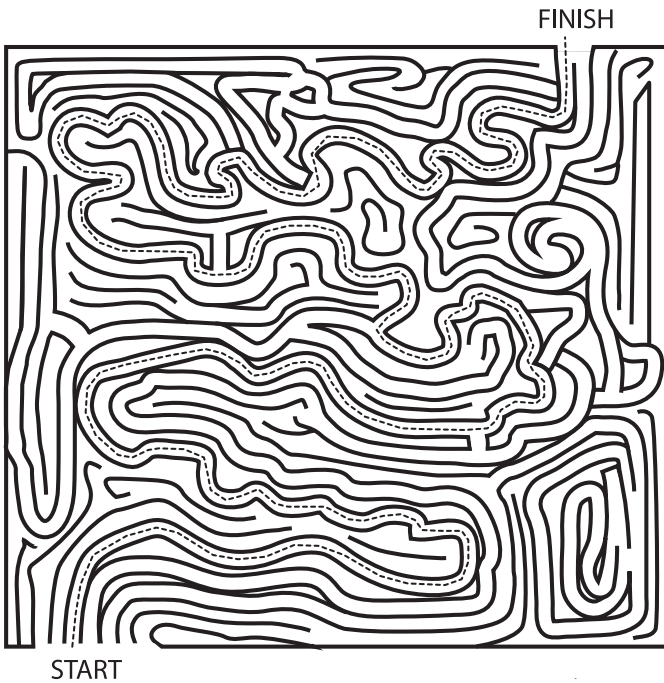


Get Alerts!

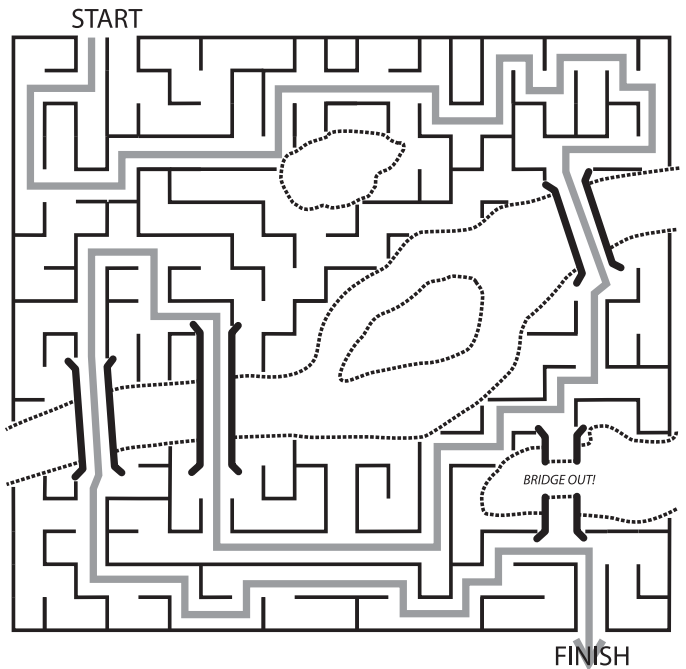


ANSWER: FLOODING HAPPENS. LESSEN THE LOSS.

Go To Higher Ground



Don't Drive into Flood Waters



Make a Plan

The four items that do not belong in the family "Go-kit" are: a swimsuit, a couch, last week's TV Guide, and a popsicle. Children are encouraged to pack a small toy to help them feel more secure.