National Geographic Kids: How Tornadoes Form

Tornadoes demolish houses, flip cars, cross rivers, dig 3 foot (0.9 meter) trenches, and lift lightweight objects 10,000 feet (3048 meters) into the air. A tornado is a lethal combination of wind and power. Tornadoes touch down all over the world, though most often in the United States.

A tornado is often a funnel cloud—a rotating column of air— that stretches from a storm to the ground. To be a tornado it must touch the ground. It can touch down for a few seconds or grind across the earth for miles. Tornadoes usually last less than 10 minutes.

Most tornadoes start from a supercell. A supercell is a rotating thunderstorm (called a mesocyclone). Supercells create the deadliest tornadoes.

The formation of a tornado is so complex, scientists have yet to understand it. The unpredictable and deadly nature of tornadoes also makes them difficult to study. No matter what movies show, scientists have had little success measuring or getting equipment into tornadoes. Not only is it dangerous, a tornado demolishes everything in its path, including measuring equipment. So, speeds and other factors remain a mystery.

The destruction caused by a tornado is undeniable and can be catastrophic. Though scientists will never be able to stop a tornado, the more they know, the more they can keep people safe.

Source: http://kids.nationalgeographic.com/explore/science/tornado/

1. Describe a tornado.

_____

_____

2. How do tornadoes form?

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3. Why are tornadoes hard to study?

_____

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4. Suppose that you have unlimited resources. How would you use these resources to study tornadoes? Be specific.

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Natural Hazards Homework Name: _____
Homework #1

3rd Grade PSI

An excerpt from:

National Geographic Kids: Ten Freaky Forces of Nature

Dodge Balls

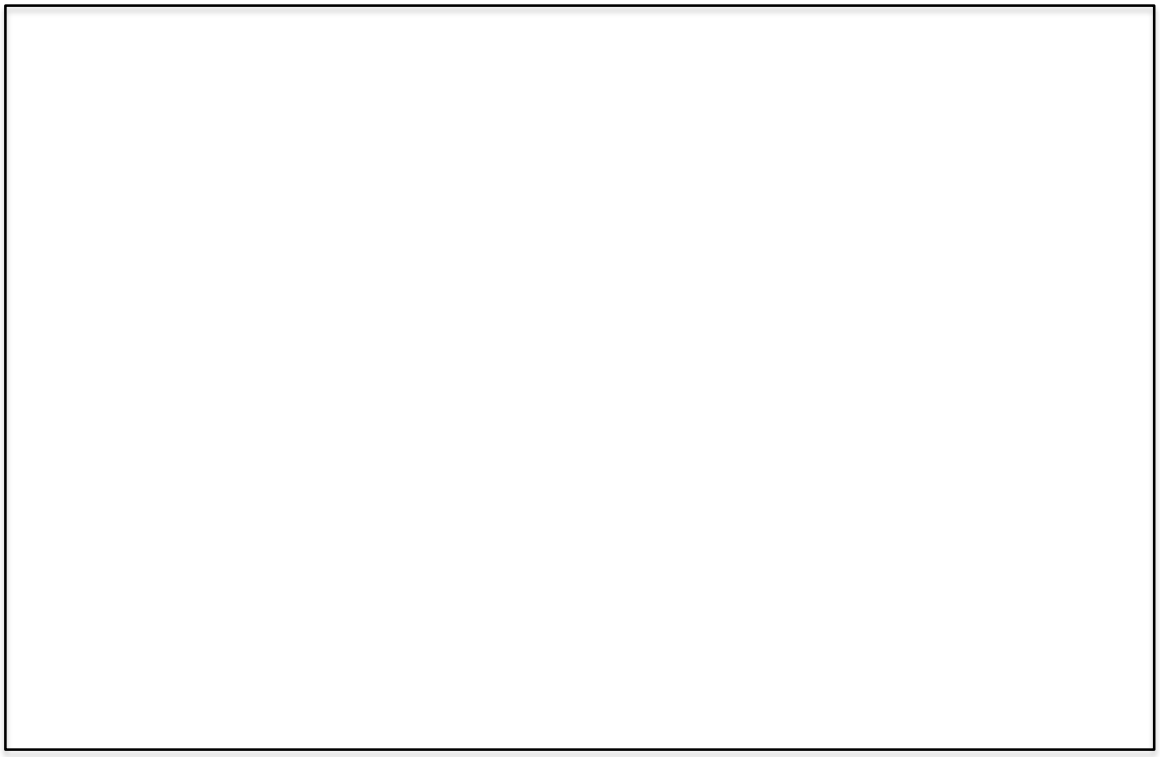
About 1,000 years ago hundreds of people were mysteriously killed in the Himalaya. A recent investigation concluded that they were caught in a hailstorm that dropped chunks of ice the size of baseballs on the victims' heads at more than 100 miles an hour (160 kilometers an hour). Hail is formed in storms when raindrops are carried into extremely cold areas of the atmosphere by powerful vertical winds. The longer the tiny specks of ice bounce around in the wind, the bigger they become. When the clumps of ice grow too big for the wind to hold up, they fall to the ground as hail.

Source: http://kids.nationalgeographic.com/explore/science/ten-freaky-forces-of-nature/

1. Hail is considered a natural hazard. Can hail be prevented?

_____

2. The National Science Foundation has heard about your work in science class. They are going to give you money to create a design that will minimize the damage of hail. Use your imagination – you can use any design that you think will work. Draw a labelled picture of your design in the box. Then, write a description of how your design will work.



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Lightning Classwork Name: _____
Classwork #2

3rd Grade PSI

Learning how to protect yourself from lightning involves understanding how lightning travels. The easiest pathway for lightning to take is from a cloud in the sky to the tallest object on the ground.

Lightning is a form of electricity. Electricity is highly attracted to some objects, such as water and metal. If you are touching any of these objects when they are hit by lightning, the electricity will travel through you as well.

Keeping these ideas in mind, explain why each of the following are examples of what NOT to do during a thunderstorm. What should you do instead?

1. Staying outside during the storm.

_____

_____

_____

_____

2. Carrying a metal backpack on your back.

_____

_____

_____

_____

3. Standing at the top of a hill.

_____

_____

_____

_____

4. Going swimming.

_____

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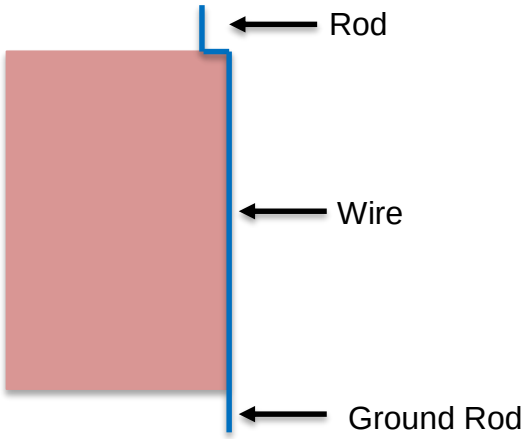
_____

Lightning Homework Name: _____
Homework #2

3rd Grade PSI

The rectangle below is a building with a lightning rod (shown in blue).



1. Would the lightning rod operate better or worse if the rod were horizontal instead of vertical? Why?

_____

_____

_____

_____

2. Would the lightning rod operate better or worse if there were no wire connected to the rod? Why?

_____

_____

_____

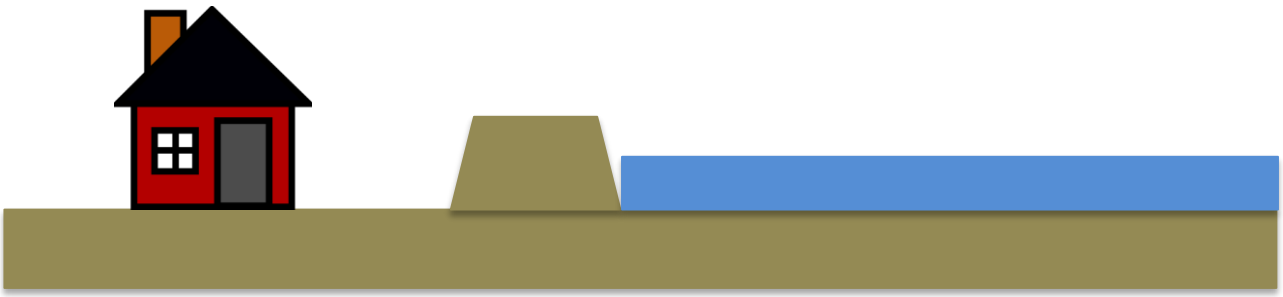
_____

Floods Classwork Name: _____
Classwork #3

3rd Grade PSI

Levees help to prevent flooding around cities. However, levees are prone to breaking, which sometimes causes even worse flooding.

On each levee image below, draw a picture of how that levee could fail. Describe what is happening underneath the image.



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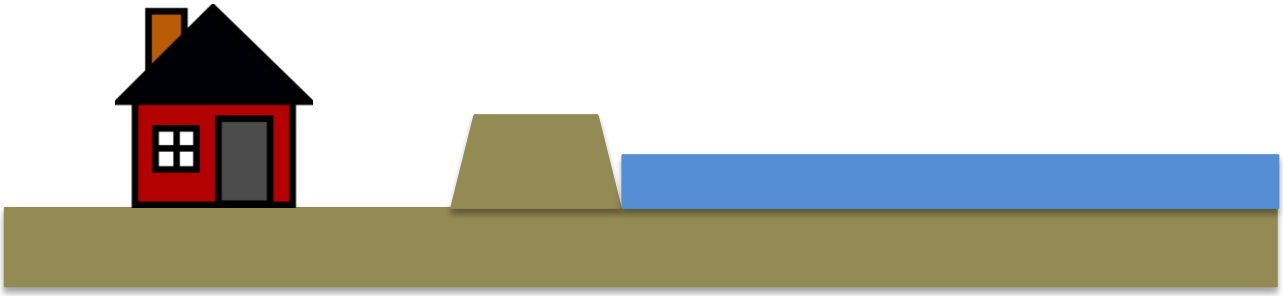

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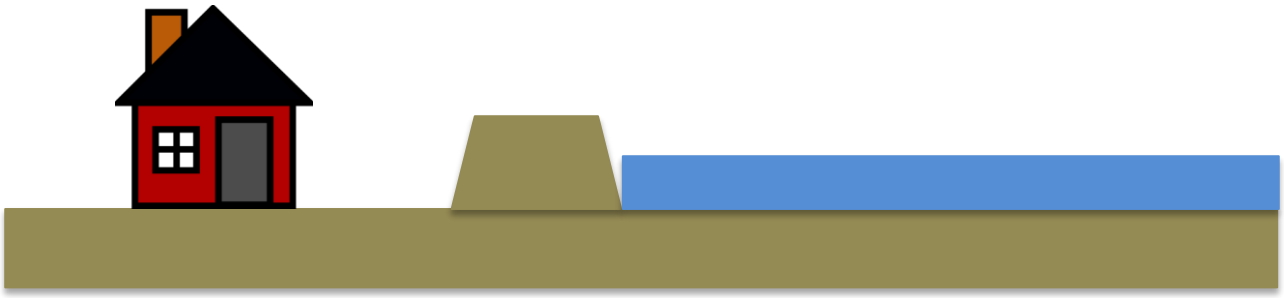
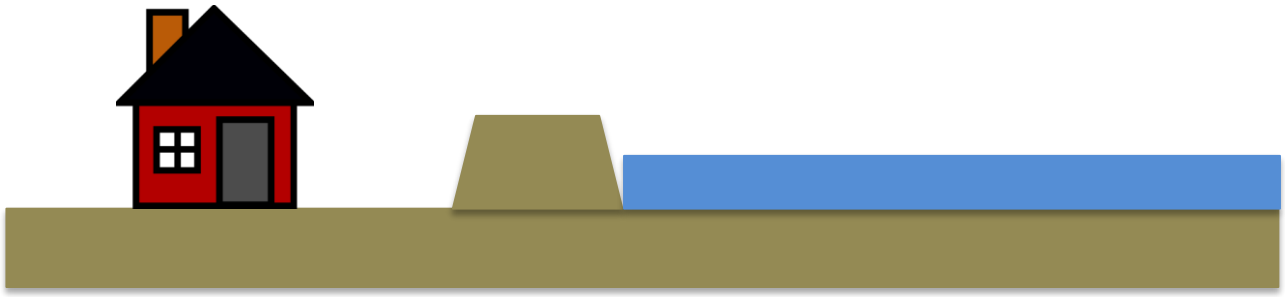


Floods Homework Name: _____
Homework #3

3rd Grade PSI

A new government committee has been started to determine how to address the weaknesses of the country's levee system. Having heard about how creative and knowledgeable you are on the subject, they have contacted you for your help.

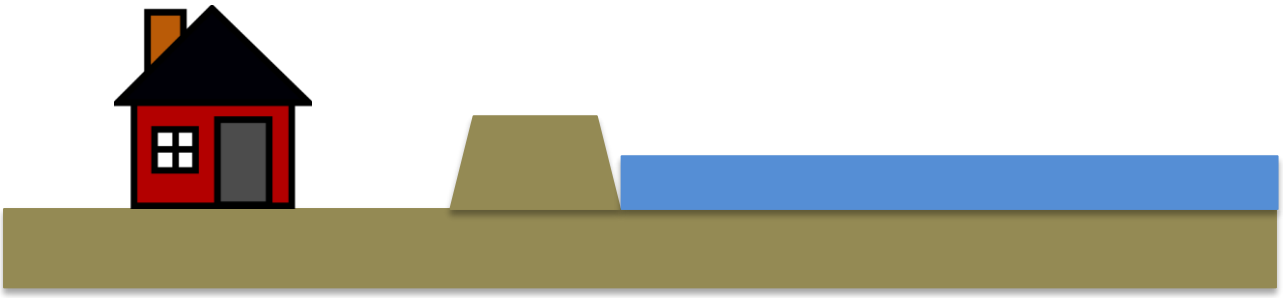
On the levee diagram below, illustrate one problem with levees that you would like to address. On the second diagram, illustrate how you would like to fix the problem. You can use any materials and you have unlimited resources. Combine your knowledge and imagination to come up with a creative solution to the problem.



The problem that I would like to address is _____

_____

_____.



My plan for addressing this problem:

_____

_____

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Wildfires Classwork Name: _____
Classwork #4

3rd Grade PSI

Many wildfires occur when the following are present: heat, drought and thunderstorms.

Describe how each “ingredient” contributes to the start of a fire. Relate each one back to the fire triangle.

Heat:

_____

_____

_____

Drought:

_____

_____

_____

Thunderstorms:

_____

_____

_____

Wildfires Homework Name: _____
Homework #4

3rd Grade PSI

Firefighters use many techniques to stop wildfires once they start. For each method below, describe how it reduces the fire. Relate each method back to the fire triangle.

Water:

_____

_____

_____

_____

Fire retardant:

_____

_____

_____

_____

Firebreaks:

_____

_____

_____

_____

Answer Key

Natural Hazards Classwork

Classwork #1

1. A tornado is a rotating column of air that extends from a cloud down to the ground.
2. Tornadoes form from rotating air in supercells.
3. Tornadoes are unpredictable. They destroy any equipment that is brought close to it.
4. Answers will vary.

Natural Hazards Homework

Homework #1

1. No, hail cannot be prevented.
2. Answers will vary.

Lightning Classwork

Classwork #2

1. Staying outside increases your chance of getting hit by lightning. You should go inside.
2. Electricity is attracted to metal. You should take the backpack off and get away from it so that lightning will not be attracted to you.
3. Lightning hits the tallest object so you do not want to stand at the top of the hill. You should go to the lowest point possible if you cannot get indoors.
4. Lightning is attracted to water. You should get out of water because if lightning hits the water, the electricity will go through you as well.

Lightning Homework

Homework #2

1. It would be less effective if it were horizontal. If the rod were horizontal, it would not be the tallest object. Lightning might hit the rod but might also hit the house.
2. It would be less effective if there were no wire. If there were no wire, the electricity would travel from the rod straight into the house. With the wire there, the electricity flows through the wire and into the ground instead of through the house.

Floods Classwork

Classwork #3

Drawings can be given in any order:

1. Overtopping occurs when water levels rise higher than the levee and flood the other side.
2. Breaching occurs when part of the levee falls apart and water gets through the resulting hole.
3. Seepage occurs when water seeps through the levee creating flooding on the other side.

Floods Homework

Homework #3

Answers will vary.

Wildfires Classwork

Classwork #4

(Fire Triangle: heat, oxygen and fuel)

- Heat: Heat is directly part of the fire triangle and helps a fire to start. Hot conditions also help to dry out vegetation, making it more flammable.
- Drought: Drought creates dry vegetation. Dry vegetation is very flammable. The dry vegetation provides the fuel from the fire triangle.
- Thunderstorms: Lightning in thunderstorms provides the spark (heat) necessary to start the fire.

Wildfires Homework

Homework #4

(Fire Triangle: heat, oxygen and fuel)

- Water: Water cools down a fire, taking away the heat.
- Fire retardant: Fire retardant cools down a fire, taking away the heat. It also smothers a fire, taking away the oxygen.
- Firebreaks: Firebreaks take away the fuel from a fire.