Dear Educator,

Thank you for taking part in The Pillowcase Project, an American Red Cross initiative that aims to bring emergency preparedness education to every community in the United States. The Pillowcase Project started in New Orleans, where the Red Cross chapter leader learned about some students who had used pillowcases to carry their belongings during an emergency. The chapter began using pillowcases to teach children about preparedness, and The Pillowcase Project soon spread to Red Cross chapters in other states. Now, the Red Cross is distributing pillowcases to children across the country and teaching them to share what they have learned about emergency preparedness with everyone in their homes.

With this teaching kit, The Science of Safety, you can bring The Pillowcase Project into your classroom as well. The teaching kit includes three classroom activities that provide students with a first-hand perspective on four natural hazards represented on the Hazards Map poster included in your packet — hurricanes, tornadoes, earthquakes, and volcanoes. These activities support the Next Generation Science Standards’ conceptual shift toward having science education reflect the interconnected nature of science as it is practiced and experienced in the real world. You can also use the My Preparedness Workbook in conjunction with these activities.

We hope that you will share The Science of Safety with other teachers in your school. Although the materials are copyrighted, you have permission to reproduce them for educational purposes. We are interested in your feedback. Please let us know what tools worked best in your classroom and what we might do to improve this teaching kit in the future. Send us your thoughts and ideas by accessing the feedback form at ymiclassroom.com/science-of-safety. Thank you!

The American Red Cross

Target Audience
This teaching kit is designed for use with students in grades 3–5 as a supplement to the science curriculum.

Standards Alignment
This program supports Next Generation Science Standards for Grades 3–5. For details, visit ymiclassroom.com/science-of-safety.

Program Objectives
• Introduce key terms and science concepts for common meteorological and geological hazards
• Help students understand what to expect and how to stay safe during severe weather and other emergency situations
• Familiarize students and their families with the emergency preparedness information available from the American Red Cross at redcross.org
• Promote science learning through collaborative research, conceptual modeling, and engineering design

Program Components
• This one-page teacher’s guide
• Three reproducible student activity sheets
• The Hazards Map poster included in your packet
• A feedback form accessible online at ymiclassroom.com/science-of-safety

Using the Program Components
• Make copies of the activity sheets for all of your students. Provide master copies of the program to other teachers in your school.
• Use the Hazards Map poster to introduce your students to some of the natural hazards that occur in the United States. Point out the hazards common to your region and talk about hazards that occur where students have relatives and friends. Explain that students will be learning about four natural hazards — hurricanes, tornadoes, earthquakes, and volcanoes — and how to stay safe when these hazards cause emergency situations.

Activity 1: Storm Watch
This small-group activity guides students through a collaborative research project using a variety of online resources (websites, maps, animations, and videos). Assign some groups to research hurricanes and others to research tornadoes. When they have completed their research, have each group report its findings in a class discussion. Use a chalkboard, whiteboard, or butcher paper to create a chart comparing the location, causes, and safety facts for these two types of violent storms. (Note: You can download a larger map for the location part of this activity at nationalatlas.gov/ printable/mages/pdohtml/states.pdf.)

Activity 2: On the Edge
This activity introduces students to the science of plate tectonics and explains how the movement of tectonic plates causes earthquakes and creates the conditions for volcanoes. Students then conceptualize a very basic model that shows these geologic forces at work and collaborate in small groups to create a working model to share with the class. For modeling ideas, see http://webecoist.wordpress.com/2012/06/earthquake-machine-and http://volcano.oregonstate.edu/education/models/index.html.

Activity 3: Designed for Safety
This activity challenges students to come up with engineering ideas that could reduce the damage to homes and cities caused by hurricanes, tornadoes, and earthquakes. The activity sheet briefly reviews some design concepts that engineers have explored already. For added inspiration, take students to http://webecoist.montastic.com/2011/04/22/disaster-proof-architecture-13-super-strong-structures, and http://earthquake.usgs.gov/learn/publications/saferstructures.

Emergency Preparedness
Conclude the program by reviewing the emergency preparedness information provided on each activity sheet and on the American Red Cross website at redcross.org/prepared/disaster. For hazards that happen in your state, practice the protective actions recommended by the Red Cross, and encourage your students to share what they learn about being prepared for emergencies with everyone in their home.

Resources
• CDC, cdc.gov/learning
• FEMA, ready.gov/kids
• NFFA, freeway.org
• NOAAWATCH, www.nsoawatch.gov
• USGS Education, education.usgs.gov
• American Red Cross, redcross.org/prepared/disaster to learn about hazards that can happen in your state and how everyone in your home can stay safe if one occurs. You can find out how to be prepared for all kinds of hazards at the American Red Cross website. Visit redcross.org/prepare/

The Science of Safety • Reproducible Master

Activity 3
Designed for Safety

Hurricanes, tornadoes, volcanoes, and earthquakes are all natural hazards. We can’t stop them from happening. We can, however, stop some natural hazards from causing so much damage. If we can find new and innovative ways to build homes and cities, there are some ideas that engineers have come up with to help protect people from the damage caused by hurricanes, tornadoes, and earthquakes:

<table>
<thead>
<tr>
<th>HAZARD</th>
<th>DAMAGE</th>
<th>PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hurricanes</td>
<td>• Strong winds destroy buildings</td>
<td>• Use concrete and steel to make buildings that resist wind damage</td>
</tr>
<tr>
<td></td>
<td>• Rain and ocean water flood towns</td>
<td>• Build away from the ocean or raise buildings up above flood waters</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Build deeper into the ground or underground so that buildings are not</td>
</tr>
<tr>
<td></td>
<td></td>
<td>exposed to as much wind</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Construct a “Safe Room” that will resist wind damage inside homes and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>businesses</td>
</tr>
<tr>
<td>Tornadoes</td>
<td>• Strong winds destroy buildings</td>
<td>• Use concrete and steel to make buildings that resist wind damage</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>businesses</td>
</tr>
<tr>
<td>Earthquakes</td>
<td>• Shaking knocks down buildings and power lines, breaks water and gas</td>
<td>• Put “shock absorbers” under buildings to lessen the effects of shaking</td>
</tr>
<tr>
<td></td>
<td>pipes</td>
<td>• Use materials that twist and stretch for power lines and pipes</td>
</tr>
</tbody>
</table>

You’ve learned a lot about these three natural hazards. Use what you know to come up with your own ideas for protecting people from the damage that one of these hazards can cause. Try to think of a new way to build homes and cities that will protect them from that hazard. If you want, you can use ideas from the chart above. Draw or describe your ideas for a hazard-safe building here, or use the back of this sheet if you need more room. You can also work with your teacher to help research your design. Here are some websites to get you started:


http://earthquake.usgs.gov/learn/publications/saferstructures

http://earthquake.usgs.gov/learn/publications/saferstructures


After you have finished your design, share it with your whole class. Ask your classmates for ideas to make your design even better.

Be Prepared
Until everyone lives in a home that’s built to protect them from natural hazards, it’s important to learn how to stay safe when a natural hazard happens. You can find out how to be prepared for all kinds of hazards at the American Red Cross website. Visit redcross.org/prepared/disaster to learn about hazards that can happen in your state and how everyone in your home can stay safe if one occurs.

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