

# SCIENCE·3D

## SEA TURTLE 360

In this packet, sample student answers are provided in **red** and notes to teachers are in **blue**.

In this **Explore Your Backyard** activity, students explore the distribution of natural disasters across the United States. They will also investigate the natural disasters that might occur in their local area and brainstorm ways to minimize risk from these hazards.



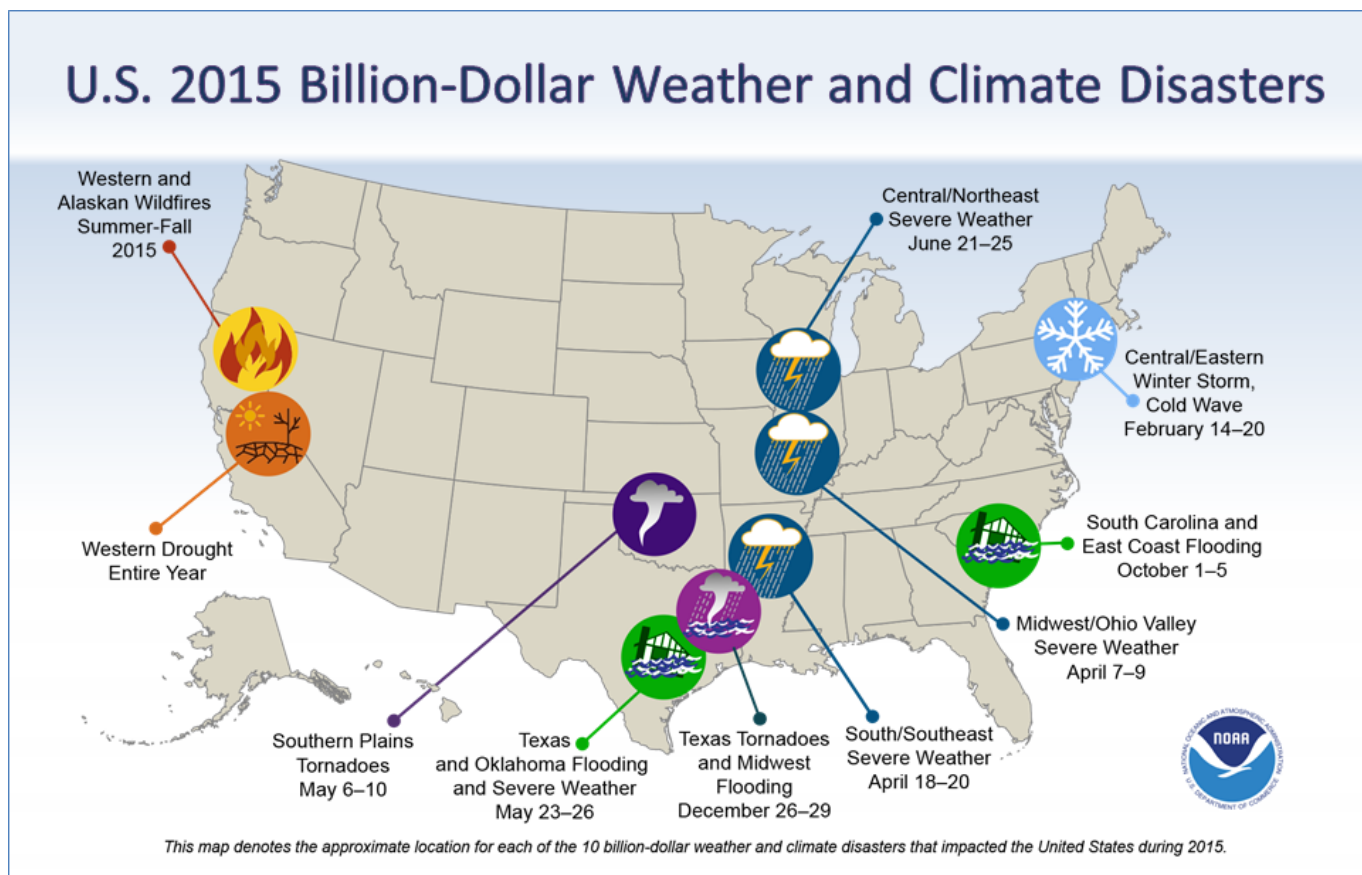
In September 2019, Hurricane Dorian hit Abaco, The Bahamas. With sustained winds of 295 kilometers per hour (185 miles per hour), Hurricane Dorian was a Category 5 storm, the highest category hurricane. Dorian is the strongest storm on record to hit The Bahamas. In addition to winds, the storm dropped about 90 centimeters of rain. It also had a 6-meter storm surge, in which the winds pushed extra water over the land. The hurricane did tremendous damage to the houses and other buildings on the island. Around 45% of houses were destroyed or seriously damaged. It also damaged the coral reefs and seagrass beds where turtles live.

Communities near the coasts in the tropics have adopted many practices and engineers have developed special technologies to reduce the damage from hurricanes.

One way people reduce risk is to use technologies that can predict when a hurricane might strike, so people can take actions to stay safe. Another way involves better ways to construct buildings to better withstand impacts. Others include using nature to protect people and coasts, such as replanting mangrove forests or restoring coral reefs. Making sure that people follow the advice of scientists and officials is also important to reduce the impact of hurricanes and other natural hazards.

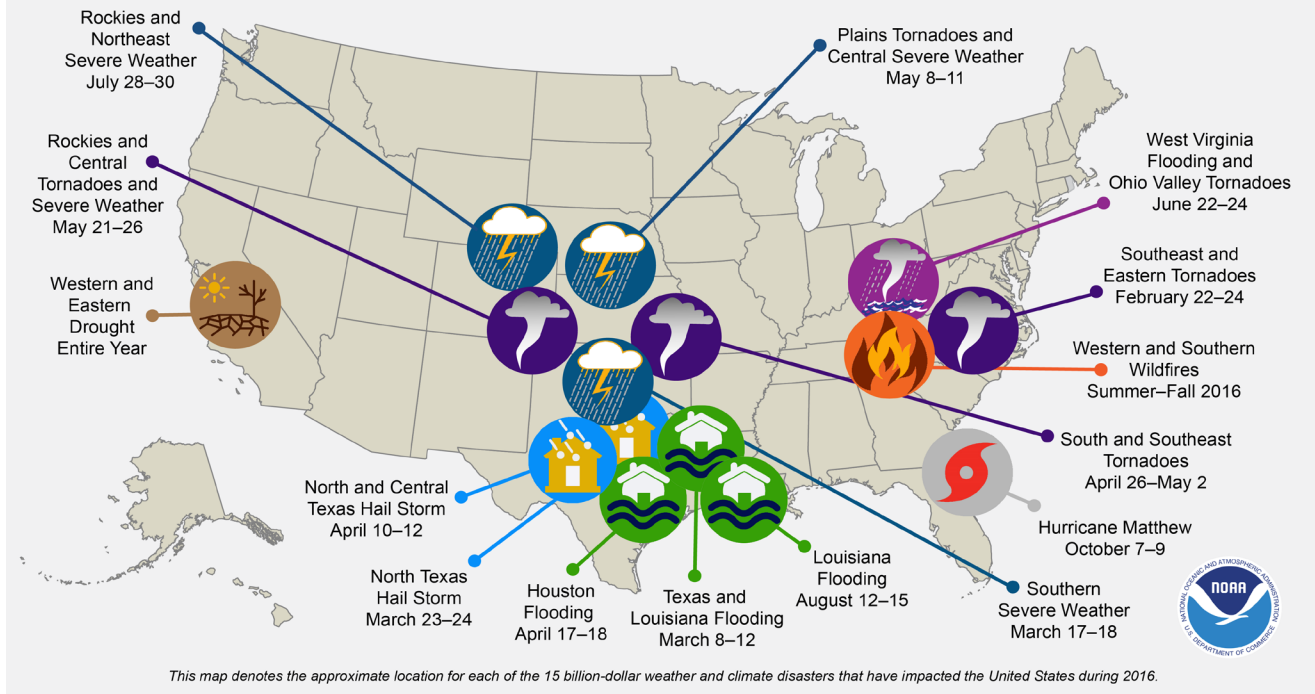
The first five maps show the natural disasters that have resulted in more than one billion dollars in damage in the United States. The sixth map shows volcanic hotspots around the world. The seventh map (on page 6) shows how the risk from earthquakes varies across the United States. Use these maps and online research to complete the following activity.

## Map 1



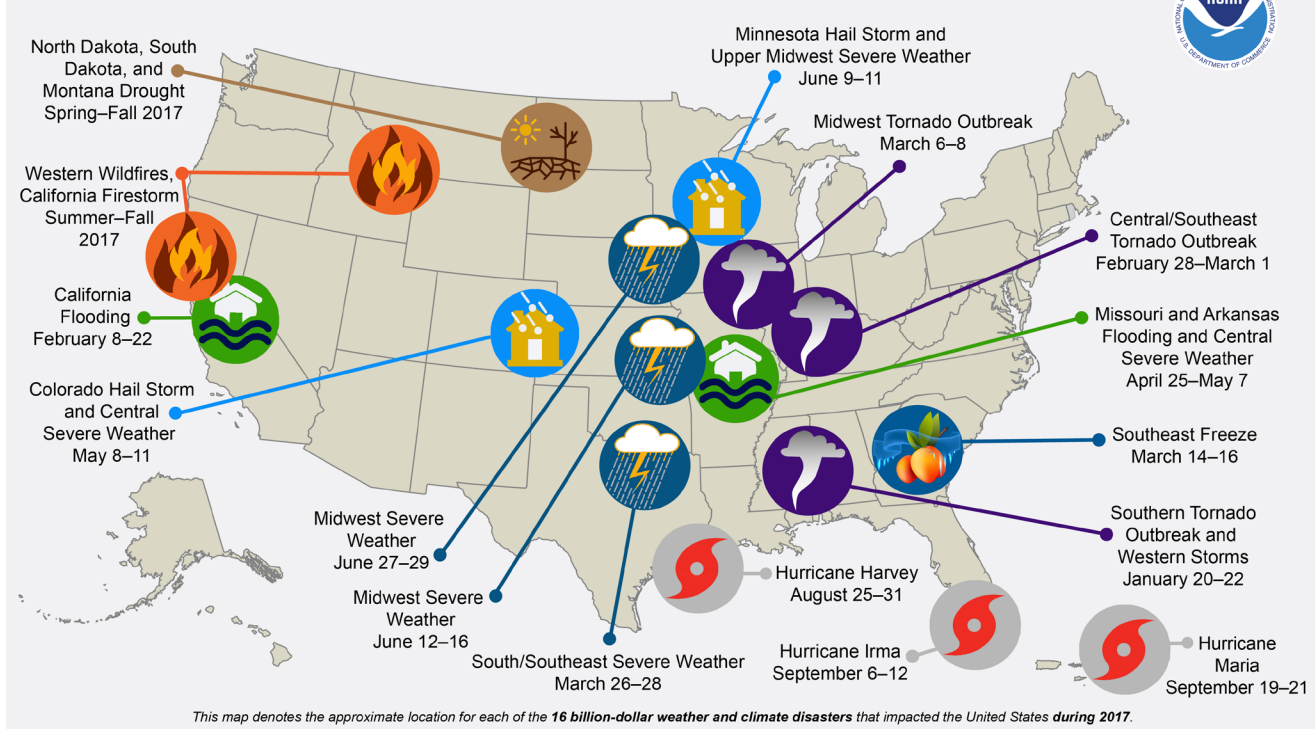
## Map 2

### U.S. 2016 Billion-Dollar Weather and Climate Disasters



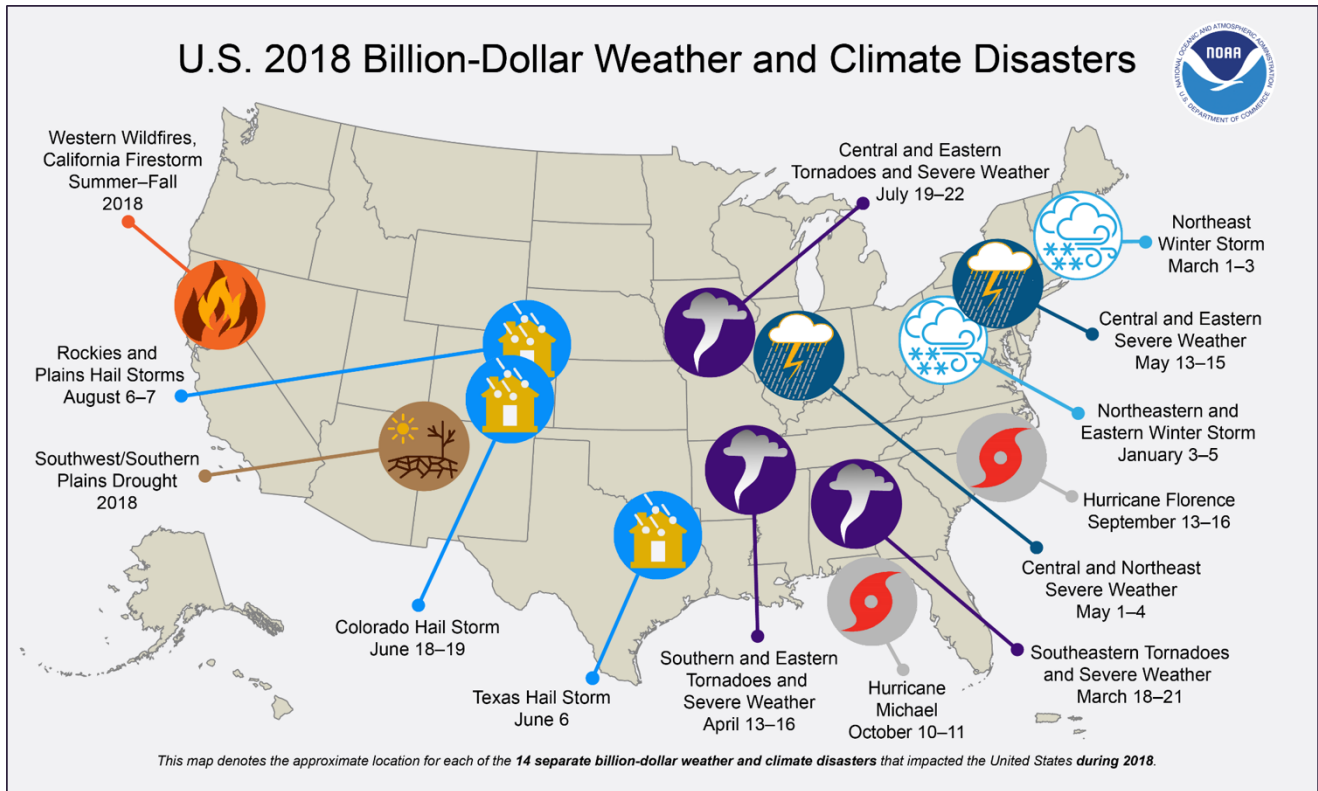
## Map 3

### U.S. 2017 Billion-Dollar Weather and Climate Disasters

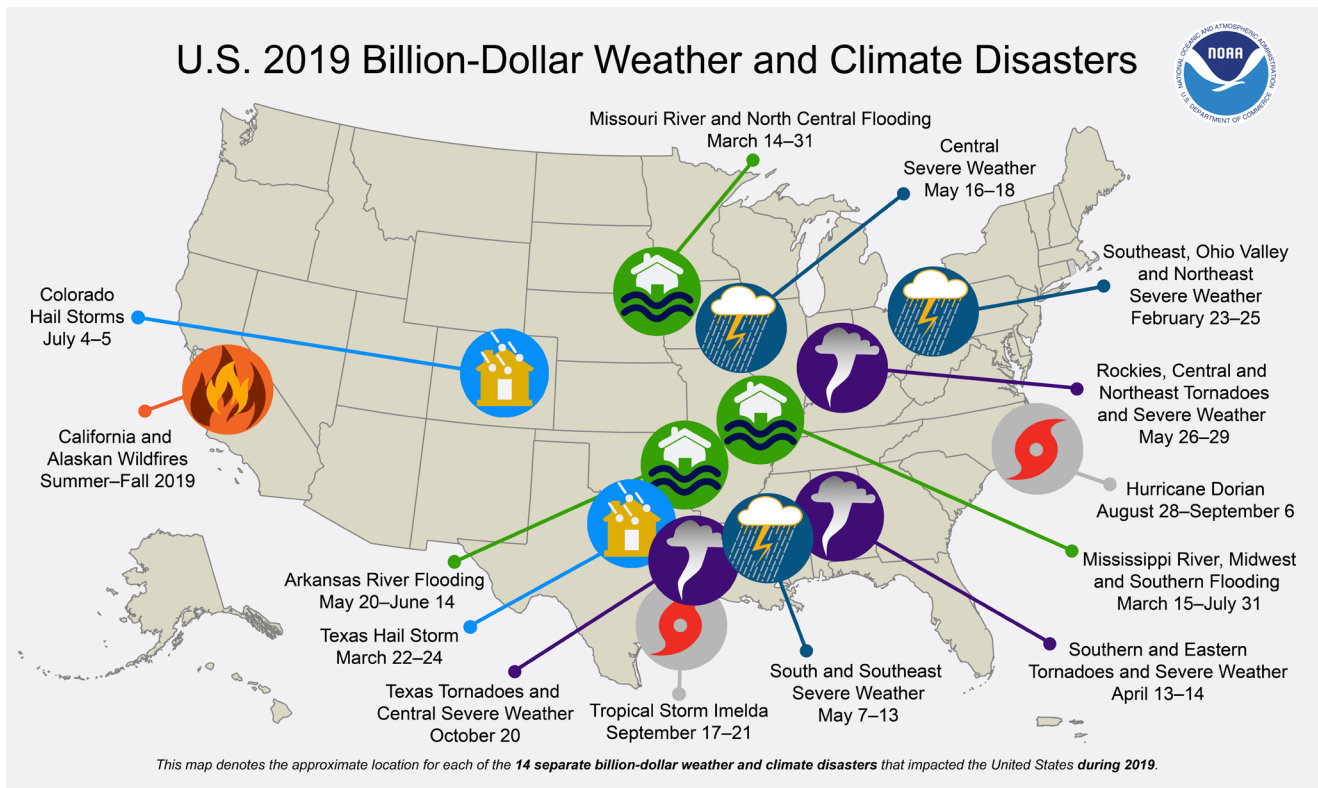




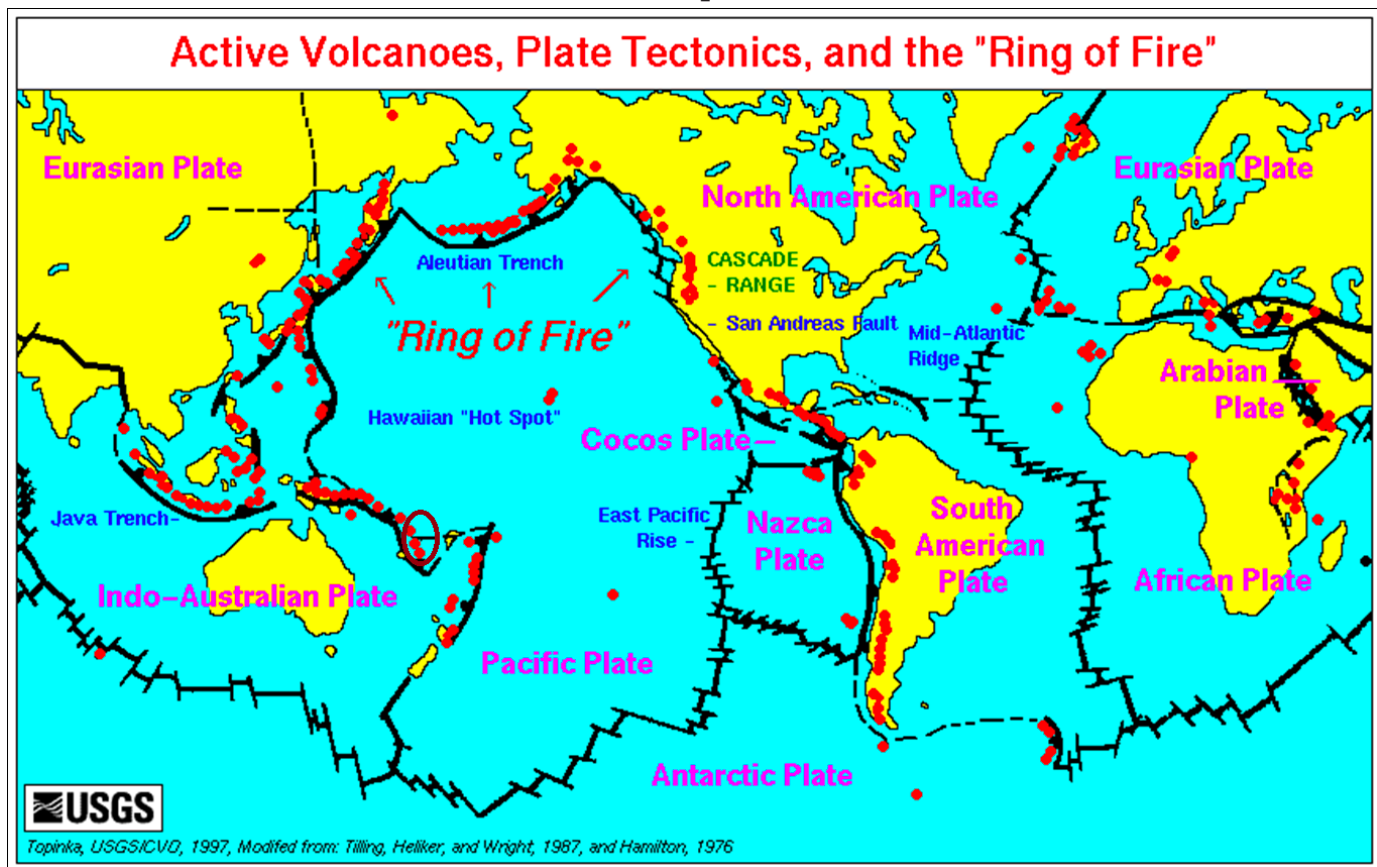
## Map 4



## Map 5



## Map 6



1. **Describe** patterns in which specific types of natural hazards (for example, hurricanes or volcanos) are most prevalent. Are there areas where there is more than one type of natural hazard that poses a major risk? If so, identify the areas and risks.

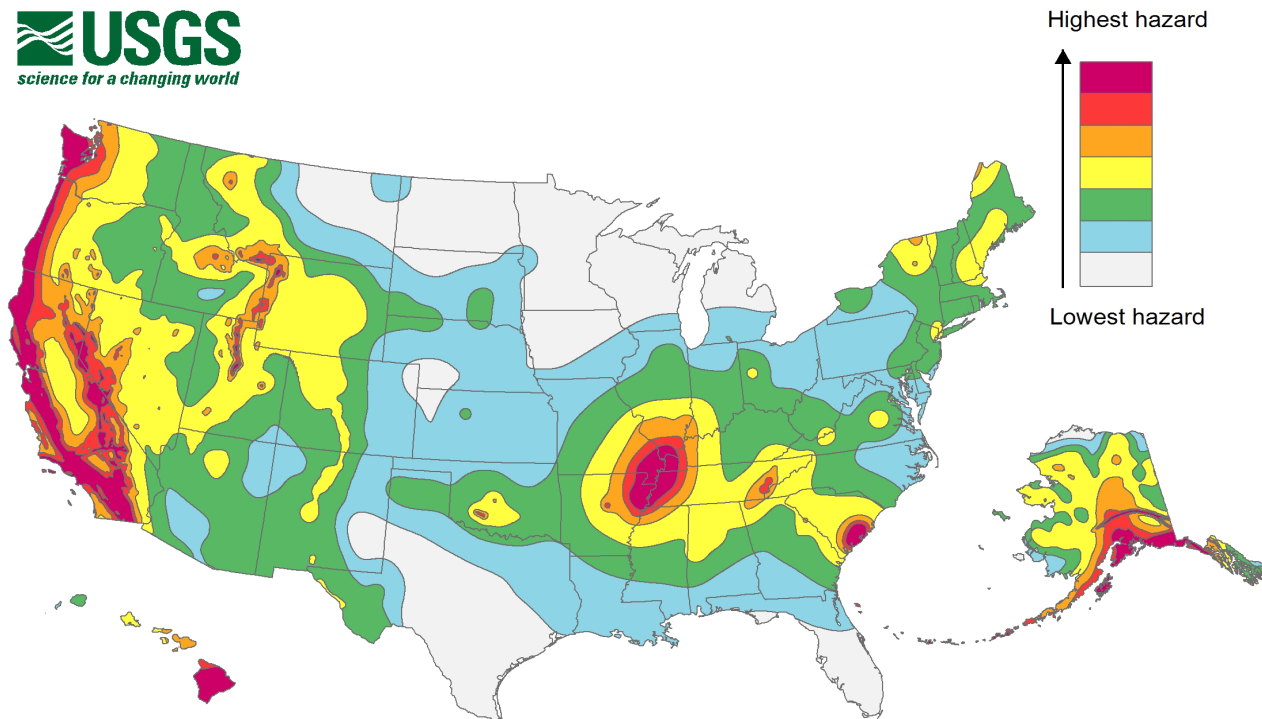
Complete answers will include: wildfires being most common in the west, tornadoes most common in the middle of the country, and hurricanes prevalent along the gulf and southeast coasts. They should identify floods, droughts, and severe weather occurring in multiple areas. Winter storms are concentrated more in the northern and central/eastern parts of the country.

**Extend the Lesson:** have students compare the location of one-billion-dollar damage storms from one year to the next. Are the patterns the same each year? Have students think about why some hazards might occur in the same general places every year while others occur in different places in different years. Have students consider if and how the patterns would influence how local communities might plan for natural hazards. Additionally, have students visit the website below to help them compare locations with the biggest threat of earthquakes to the presence of faults. This activity connects to standards and lessons on geosciences and earth processes.

<https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=5a6038b3a1684561a9b0aadf88412fcf>

## Map 7

### Earthquake Hazard Areas Across the United States



2. Use the map above to **describe** how the risk of earthquakes differs across the United States.

The West Coast has a much higher risk of earthquakes than most of the country. There is also high risk in areas of Hawaii and Alaska and in the middle of the country. There is a small area on the East Coast as well. These maps provide an opportunity for students to explore their US geography. You could extend the lesson or work with other classes to develop an activity that evaluates earthquake risk on a state-by-state basis by locating each state on the map.

3. Based on the previous maps, **list** the natural hazards that have affected areas closest to where you live. **Describe** what natural hazard is the biggest risk in your area. Use evidence from the maps to support your answer.

Answers will vary based on location.

4. **Write** a paragraph about the risks from the natural hazard that you listed in question number 3. Include the following in your answer: 1) what the natural hazard is; 2) how it affects built structures, the natural environment, and people; 3) how engineers have changed how structures are built to reduce risk; 4) how individual people can behave to reduce risk; 5) how communities can reduce risk. Use additional online resources or books to support your answer.

Answers will vary based on the natural hazard selected. One resource you could provide to students is the FEMA guide at FEMA risk reduction:

[https://www.fema.gov/media-library-data/20130726-1559-20490-9492/1231\\_brochure\\_revised.pdf](https://www.fema.gov/media-library-data/20130726-1559-20490-9492/1231_brochure_revised.pdf)

For example: Hurricanes are the biggest hazard in my area. Heavy winds can destroy houses and knock down power lines. Hurricanes can destroy natural environments by knocking down trees or flooding areas with saltwater. People can get injured if winds damage their homes. Power outages can also be a major problem since they make it difficult for people to get food and other necessities. In an effort to reduce risk, engineers have designed houses to be built with strong materials. They also have designed roofs that can withstand high winds and glass that can withstand impacts. We have shutters that can block objects that might break windows. People should prepare for hurricanes by having the right supplies and bringing in objects that might fly away. They also should put shutters on their windows. They need to stay inside during the storm and follow any evacuation orders. Communities can reduce risk by having shelters for people that can't stay where they live. Building codes help ensure structures can withstand storms. Replanting mangrove forests can help protect our coasts.

5. **Describe** a problem that people face from a natural hazard of your choosing (for example, buildings are destroyed by big storm surges during a hurricane). Then, **propose** a solution to the problem.

Answers will vary based on the natural hazard and problem selected; complete answers will have a solution that would reduce risk even if it is impractical or very expensive.

**Extend the lesson:** Have students discuss how they would design and test their solutions.

**Extend the lesson:** Have groups of students or individual students make posters that describe a natural hazard and ways to reduce the threat from that natural hazard. Make sure that as a class each natural hazard is covered. After posters are complete, have students present them to the rest of the class. You could have students suggest, provide, and then apply feedback to their posters. This highlights the importance of teamwork and multiple viewpoints in disaster planning and mitigation.