

Strand: 8.4	Standard: 8.4.5	Episode 1	Big Idea: There are patterns in the occurrences of natural hazards and these patterns can be used to predict future catastrophic events.
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Title: Ready or Not!	Time: 45 minutes	CCCs <u>Cause and Effect</u>	Practices Ask Questions and Define Problems
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Episode Snapshot

The students will experience a phenomenon in which earthquakes of similar energy that occurred in two different cities are compared. They will make observations and **ask questions** about why the effects were so different for the two earthquakes. The students will explore specific examples of natural hazards from current events and **ask questions** about them. They will then begin to **define the possible problems** natural hazards may cause for their fictional city.

Gather

Show the students the following video clips. As they watch the clips, they will record observations about the damage caused by the two earthquakes on their [phenomenon sheets](#).

- [Aftermath of the Haiti 2010 earthquake](#)
- [Sendai, Japan earthquake, 2011](#) (watch the first 4 minutes of this one. If you use a different video, try to find one that shows damage that was caused only by the shaking, NOT the tsunami.)

Explain that both of these earthquakes occurred about a year apart and had the same intensity.

(Note: while the Haiti earthquake was a 7.0 and the Japan earthquake was 9.1, both had the same shaking intensity rating (IX violent) because the Haiti earthquake was shallow).

Present them with the information in the table below comparing the results of the two earthquakes and ask them to add to their observations contrasting the two earthquakes on their phenomenon sheet.

	Haiti	Japan
Date	1/12/2010	3/11/2011
Magnitude	7.0	9.1 (a 9.0 earthquake releases 1000 times more energy than a 7.0)
Shaking Intensity	IX (violent)	IX (violent)
Duration	30 seconds	6 minutes
Deaths	100,000-316,000	15,896 (about 90% were drownings as a result of the tsunami)
Structures damaged	121,776 structures collapsed \$360 billion	280,000 structures collapsed \$14 billion

Ask the students on their phenomenon to explain why they are seeing such different results between the two cities. Share their explanation with a partner and together come up with three questions about what caused the phenomenon.

What is a natural hazard?

Gather a collection of video clips, stories, or images of natural hazards. Try to take these from events that are as recent as possible. Consider the following hazards to discuss with your students: volcanic eruptions, earthquakes, floods, tornadoes, hurricanes, landslides and rockfalls, avalanches, sinkholes, severe thunderstorms, freezing rain, tsunamis, and wildfires.

Before showing the videos, as a class, come up with a definition of what they think a natural hazard is. Write this definition on the board. Ask each student city group to predict at least three natural hazards they think will be a threat to their city. (They will revisit this list and record it on Part Two of their City Charter after your discussion of types of natural hazards.)

Select one video of a natural hazard event, show it to the students and list the hazard on the board. Before showing the rest of the videos, ask students to name other hazards that they can think of. As they think of a hazard, show them a video of that event and add it to the list on the board. Keep a list of the hazards the students come up with somewhere the students can refer to it. When the students are out of ideas, mention any hazards that they missed.

As a class, revisit your definition of a natural hazard. Do you need to add to it? If you have access to computers, ask a student to look up an official definition.

“A natural hazard is a threat of a naturally occurring event that will have a negative effect on humans. This negative effect is what we call a natural disaster. In other words when the hazardous threat actually happens and harms humans, we call the event a natural disaster.”

http://www.tulane.edu/~sanelson/Natural_Disasters/introduction.htm

Reason

After showing all the videos come up with a list of **questions** that students have about natural hazards. Guide their questions towards the following ideas:

- Which of these hazards are a risk in the area in which I live?
- How often do these disasters happen?
- What causes these disasters to happen?
- How much damage and what kind of damage do these disasters cause?
- Do any of these hazards occur together?
- What can we do to prevent these disasters or mitigate their effects?

Communicate

Ask students to return to their list of hazards and add to it if they think any of the other hazards in the videos will affect their city. They will now record their final ideas on Part Two of their City Charter. Encourage them to make this list as thorough as possible because any risk they fail to identify could cause damage to the lives and property of the people in their city.

Each student will then choose one or two of these hazards and record them next to their name on the City Charter sheet. They will become an expert on these hazards and ultimately come up with a proposal of steps their city can take to protect themselves from the hazard. Make certain each hazard threatening the city is covered by at least one student in the group and that at least one person in the entire class covers each of the major hazards from your class discussion.

Assessment: Students will need to be able to communicate what a natural hazard is. You can do this with a journal question or an exit ticket.

Students should be able to explain that a natural hazard is a naturally occurring event that has the potential to harm human life and property.

Materials, resources, handouts, etc:

[Phenomenon Sheet](#)

Video clips or images of natural disasters