



Overview:

Helping your community become more resistant to damage by natural disasters begins by identifying the natural hazards that pose the greatest danger to your community. In this lesson, students interview community members to begin gathering information on local hazards, and then extend their exploration of hazards through research.

Targeted Alaska Grade Level Expectations:

Science

- [9] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.
- [10-11] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, analyzing data, developing models, inferring, and communicating.
- [11] SA3.1 The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by conducting research and communicating results to solve a problem (e.g., fish and game management, building permits, mineral rights, land use policies).
- [9-11] SD2.1 The student demonstrates an understanding of the forces that shape Earth by recognizing the dynamic interaction of erosion and deposition including human causes.
- [9-11] SD2.2 The student demonstrates an understanding of the forces that shape Earth by describing how the theory of plate tectonics explains the dynamic nature of its surface.
- [10-11] SE3.1 The student demonstrates an understanding of how scientific discoveries and technological innovations affect our lives and society by researching a current problem, identifying possible solutions, and evaluating the impact of each solution.

Writing

- [9-10] 4.5.1 The student documents sources by giving credit for others' ideas, images, and multimedia information, including others' ideas directly quoted or paraphrased by student, by citing sources using a standard method of documentation (e.g., MLA or APA style) (L)

Targeted Alaska Cultural Standards:

- D1 Culturally knowledgeable students are able to engage effectively in learning activities that are based on traditional ways of knowing and learning. Students who meet this cultural standard are able to acquire in-depth cultural knowledge through active participation and meaningful interaction with Elders.
- E2 Culturally knowledgeable students demonstrate an awareness and appreciation of the relationships and processes of interaction of all elements in the world around them. Students who meet this cultural standard are able to understand the ecology and geography of the bioregion they inhabit.

Objectives:

The student will:

- identify natural hazards that pose the greatest risk to the community;
- research the history and science of each hazard; and
- present a summary of the findings.

Materials:

- Computers with Internet access
- KMZ files (available on ATEP website) or community Maps
- Digital cameras (optional)
- STUDENT WORKSHEET: “Hazard Investigation”
- STUDENT WORKSHEET: “Hazard Profile”
- STUDENT INFORMATION SHEET: “Internet Sources”

Whole Picture:

The areas along the Aleutian Megathrust are at high risk of experiencing earthquakes, volcanoes and tsunamis. Earthquakes, volcanoes, weather-related activity or human activity may trigger landslides, or slope failure. Landslides, earthquakes and volcanic activity can lead to tsunamis. In addition to seismic activity, the Aleutian Arc is known for the harsh weather and storms, thus increasing the likelihood of enduring multiple natural hazards.

One of the first steps in designing a mitigation plan is to assess risks. In assessing risks, hazards need to be identified and understood. The worksheets and activities in this lesson were modified from the Federal Emergency Management’s (FEMA) worksheets for identifying and profiling local natural hazards. Additional steps in assessing risk include taking an inventory of assets and estimating losses. A detailed local-level risk assessment is a valuable tool for local communities working with the state towards hazard mitigation.

Activity Preparation:

1. Determine your preferred method for recording information on community maps. Option include:
 - satellite imagery viewable as KMZ files on Google Earth (http://www.aktsunami.com/student_resources/resources_satImages.html) or
 - Downloadable PDFs (http://www.aktsunami.com/student_projects.html)
2. Determine if you will invite the panel of community members for the interview or if the students will. Guide students in selecting people to invite who have lived in the community for a long time, like Elders, who can speak to the history of natural hazards and have a sense of what may be a danger in the future. Ask them to share any artifacts that show the effects of the natural hazard, e.g., pictures taken before, during, or after the event; maps; newspaper clippings; or letters that highlight the hazard.

Activity Procedure:

1. Explain that helping your community become more resistant to damage by natural disasters begins by identifying the natural hazards that pose the greatest danger to your community. In this lesson, students will work at gathering locally based knowledge and expand that knowledge with research.
2. Distribute STUDENT WORKSHEET: “Hazard Investigation” and briefly review the worksheet and show the selected map for recording data.
3. Introduce the panel members and conduct the interview as a class. Record, or assign a student to record information on the map based on the interview. After the interview, discuss the information students recorded on the worksheet and agree upon the hazards that pose the greatest risk and should be profiled for more information.
4. Distribute and discuss STUDENT WORKSHEET: “Hazard Profile.” Hazards may be assigned and researched by individuals, pairs or groups. Distribute STUDENT INFORMATION SHEET: “Internet Sources” as a starting point of possible resources.

5. The class collaborates or individuals work to organize the research to present to community leaders. Encourage the use of maps and other visuals in presentation.

Extension Idea:

Conduct the interview as a walk throughout the community and see vulnerable areas firsthand.

Answers:

Answers will vary

Lesson Information Sources:

United States. (2001). *State and local mitigation planning: How-to guide: Understanding your risks, identifying hazards and estimating losses*. How-to guides. [Washington, DC]: FEMA.

Name: _____

Hazard Investigation

Student Worksheet



What natural hazards affect your community?

Interview a panel of community members who can speak to the history of the community and the natural hazards that have affected it in the past and what hazards pose a danger to the community now and in the future. Ask them to share any artifacts that show the effects of the natural hazard, e.g., pictures taken before, during or after the event; maps; newspaper clippings; or letters that highlight the hazard. Have a map available to note locations and extent of damage from past events.

The following checklist is a list of possible hazards supplied by the Federal Emergency Management Agency (FEMA).

1. Check the hazards that have affected your community in the past or could be a danger to your community now.

- | | | |
|--|--|---|
| <input type="checkbox"/> Avalanche | <input type="checkbox"/> Coastal Erosion | <input type="checkbox"/> Dam Failure |
| <input type="checkbox"/> Drought | <input type="checkbox"/> Earthquake | <input type="checkbox"/> Expansive Soils* |
| <input type="checkbox"/> Extreme Heat | <input type="checkbox"/> Flood | <input type="checkbox"/> Hailstorm |
| <input type="checkbox"/> Hurricane | <input type="checkbox"/> Land Subsidence | <input type="checkbox"/> Landslide |
| <input type="checkbox"/> Severe Winter Storm | <input type="checkbox"/> Tornado | <input type="checkbox"/> Tsunami |
| <input type="checkbox"/> Volcano | <input type="checkbox"/> Wildfire | <input type="checkbox"/> Windstorm |
| <input type="checkbox"/> Other: _____ | <input type="checkbox"/> Other: _____ | |

*Expansive soils are soils that have a high clay content and increase in volume as they absorb water.

2. On a separate sheet of paper, record notes on hazards in your community based on the interview. Note the type of hazard and other supporting information such as, dates and times, injuries, damage, artifacts or other sources of information brought in by the interviewee.

3. Do any of the hazards cause more of a concern because of its severity, repetitiveness, or likelihood of occurrence? Describe. _____

4. Based on this interview, list the hazards that should be profiled for more information.

Name: _____

Internet Sources

Student Information Sheet



General

Alaska Division of Homeland Security & Emergency Management for information on all natural hazards affecting Alaska (<http://www.ak-prepared.com/>)

Alaska Tsunami Education Program has a link to send questions via email to scientists (<http://www.AKtsunami.org>)

Alaska Division of Geological & Geophysical Surveys collects and distributes information about the state's geologic resources and hazards. One of the links at this site is "Ask a Geologist" (<http://www.dggs.dnr.state.ak.us/>)

U.S. Geological Survey (<http://www.usgs.gov/>)

Tsunamis

The National Geophysical Data Center (NGDC) Tsunami Runup Search contains information on locations where tsunami effects occurred (http://www.ngdc.noaa.gov/hazard/tsu_db.shtml)

West Coast and Alaska Tsunami Warning Center (<http://wcatwc.arh.noaa.gov/index.php>)

Earthquakes

Alaska Earthquake Information Center (<http://www.aeic.alaska.edu/>)

AEIC Earthquake Database Search contains information on earthquakes. This will require that you identify latitude and longitude of the area you are researching (http://www.aeic.alaska.edu/html_docs/db2catalog.html)

Volcanoes

Alaska Volcano Observatory (<http://www.avo.alaska.edu/>)

Weather-related Hazards

Alaska Climatology displays information from around the state on temperature, precipitation, and storms (<http://climate.gi.alaska.edu/Climate/>)

Alaska Region Headquarters National Weather Service (<http://www.arh.noaa.gov/>)