SHERRI'S CHOICE: TEACHER GUIDE

Subject: Earth Science
Grade Level: Middle School
Last Updated: September 25, 2007

Case Summary

Two college students are trying to decide where to spend their two month anniversary. Justin wants to go to the Indonesian coastline and Sherri has some reservations concerning his choice due to past tsunami occurrence. Sherri suggests that if Justin can provide evidence that the likelihood of tsunami occurring during their mid summer vacation is not likely she would consider it.

Credits

This case was adapted by Yasmine M. McKenzie (teacher, Bethune Middle School, Atlanta, GA) and Jennifer J. Pokorny (PhD student, Psychology, Emory University, Atlanta, GA) fellows of the Emory University PRISM program (http://www.prism.emory.edu). Authors may be contacted at jpokorn@emory.edu

This case was inspired by:

DeLoney, D. Y., Turner, B. L., & Haensly, J. W. (2006). *Tsunami Disaster* Retrieved June 07, 2007. from Emory University, CASES Online Web site: http://www.cse.emory.edu/cases/casedisplay.cfm?case_id=623

Learning Objectives

1. List and describe the various types of tectonic plate boundaries.
2. Explain what types of tectonic activity ultimately cause tsunamis.
3. Describe the formation and movement of tsunamis from the open ocean to shoreline
4. Describe the human impact of tsunamis, including public health, demographic, environmental and economic fallout.

Georgia Performance Standards

SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.
S6E3. Students will recognize the significant role of water in earth process.
S6E5. Students will investigate the scientific view of how the Earth's surface is formed.
S8CS9. Students will understand the features of the process of scientific inquiry.
SS7G9. The student will be able to describe and locate important physical and human characteristics in Southern and Eastern Asia.

 This material is based upon work supported by the GK-12 program of the National Science Foundation, under Award #DGE0536941. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. *CASES Online* is brought to you by the Emory College Center for Science Education, Emory University, Atlanta, GA. This document and other resources are available from the *CASES Online* Web site, http://www.cse.emory.edu/cases

Assessment

Students will be able to turn in a completed box charts at the end of their case. The box chart will be assessed for completion and clarity. Assessment of the box charts should encourage students to actively participate in class discussion.

For their authentic assessment, students will choose from a number of possible products based upon their chosen role. The following roles to choose from are: the Indonesian Tourist Board, the Hawaii Travel Agency Association, an expert Scientist, Justin, journalist and an engineer. Possible products will be: brochures, commercials, power point presentations, 3D models and a newspaper article.

The final grade will be based upon their completed box charts, products and group evaluation. See included self/group evaluation worksheet and performance task choices.

PERFORMANCE TASKS

Role	Expectation	Performance
Indonesian Tourist Board	Advertise for hotel/resort vacations on the Indonesian coastline	Brochure reassuring tourists to visit Indonesian coastline and the low risk of Tsunamis occurring
Hawaii Travel Association	Promote Hawaiian vacations and low risk of Tsunami	Commercial promoting a vacation package to college students
Scientists	Gather information to predict Tsunamis and provide early notification to vulnerable locations	Create a power point on causes /effects of Tsunamis and areas most likely to experience them during the summer.
Justin	Persuade Sherri that the vacation to Indonesia will be a better choice than a Hawaiian vacation	Skit illustrating Justin's argument to visit Indonesia and not Hawaiian islands. Provide information on Tsunamis in skit.
Journalist	Provide an unbiased view on vacationing in Indonesia or Hawaii the benefits and dangers	Newspaper article that describes possible scenarios associated with vacationing in tectonically active destinations.
Engineer	Convince Hotel investor that Hawaii and Indonesian coastline is too tectonically active to pursue resort development	Create a 3D model of either Hawaiian or Indonesian coastline and the underlying plates.

Adapted from Torp, L., & Sage, S. (1998). Problems as Possibilities: Problem-based learning for K-12 education. Alexandria, VA: Association for Supervision and Curriculum Development.

Implementation Strategy

This case is designed to take place over six 60-minute class sessions. It has one scripted scene. The students will brainstorm in pairs and then back as an entire class.

During group discussion teacher/facilitator will float from group to group to check progress and assist students with any difficulty that may arise. During class discussion teacher/facilitator or student can take notes on the board so that learning issues missed by an individual group can be addresses as a class.

Implementation Schedule

Day 1 (60 minutes total)
- Sponge exercise (10 minutes)
- Read scene 1 (5 minutes)
- Complete box chart individually (10 minutes) then as a class (20 minutes)
- Roles assigned to each pair (10 minutes)
- Wrap up (5 minutes)

Day 2 (60 minutes total)
- divide learning issues between the pair (10 minutes)
- Media Center: Research learning issues (50 minutes)

Day 3 (60 minutes total)
- Media Center: Research learning issues not addressed in previous searches (60 minutes)
- Begin working on products if finished with research

Day 4 (60 minutes total)
- Outline presentation layout and content; divide up contributions to the final product among group members based on interest, skill, etc.
- Begin working on presentation products

[case interruption, we were not able to finish the case]

Day 5 (60 minute total)
- Work on final product and finalize what is to be included or excluded
- Review rubric against product and prepare for presentation day

Day 6 (60 minutes total)
- Present product to class
- Complete self/group evaluation

Case Notes

What went well:
The students enjoyed reading the scene – this is the first case that we did that was in a skit format. It immediately got their attention and they all participated in generating facts and learning issues.

Having the students draw roles out of a bag worked well – they didn't seem to complain as much about the role they selected because they see that it is randomly selected.

Suggested learning Issues:

- Describe how the Pacific warning system "works".
- Why didn't the scientists who knew that an earthquake had occurred in the Indonesian area send out warnings about a possible tsunami?
- What are nature's three tsunami warning signs?
- A British girl vacationing in Thailand saved lives because she knew what the retreating water that preceded the tsunami meant. What does this say about tsunami education in regions where they may occur?
- Tsunami warning systems are expensive. What criteria do you think decision-makers should use in deciding whether to invest in such a warning system in oceans throughout the world?
    - What event caused the tsunami on December 26, 2004?
    - Do all earthquakes cause tsunamis? What other factors might be important?
    - How is the strength of tsunami waves related to the topography of the seafloor?
    - Why do you think the tsunami waves diminished in height the further away from the epicenter they traveled?
    - If you were going to explain a tsunami to somebody else, what materials could you gather to demonstrate how tsunamis form?
    - The tsunami caused a great deal of destruction, both to human life and the structures in the coastal areas. What might have been done to lessen the destructive aspect of the tsunami?
    - What causes a tsunami?
    - How might all of this information be used in the future?

Resources:

Background reading provided to students
Teachers' Domain (2009). Once and future tsunamis. Retrieved August 15, 2009 from http://www.teachersdomain.org/resource/ess05.sci.ess.watcyc.oncetsunami/

Indonesia tourism info
Tourism Indonesia (2009). Retrieved August 15, 2009 from http://www.tourismindonesia.com/

Lonely Planet (2009). *Indonesia*. Retrieved August 15, 2009 from http://www.lonelyplanet.com/worldguide/destinations/asia/indonesia

Indonesia Tourism (2007). *Visit Indonesia*. Retrieved August 15, 2009 from http://www.indonesia-tourism.com/

Likelihood of tsunami hitting Indonesia
Blog Critics (2005). *Another earthquake in Indonesia's tsunami devastated region*. Retrieved August 15, 2009 from http://blogcritics.org/archives/2005/03/29/064013.php

2004 Tsunami info
Geology.com (2009). 2004 *Indonesia tsunami maps*. Retrieved August 15, 2009 from http://geology.com/articles/tsunami-map.shtml

General tsunami info
National Oceanic and Atmospheric Administration (2009). *Tsunami*. Retrieved August 15, 2009 from http://www.tsunami.noaa.gov/

Paacific Tsunami Museum (2007). *Science programs*. Retrieved August 15, 2009 from http://www.tsunami.org/summary.html

Tsunami visualizations
McDaris, J. (2009). *Tsunami visualizations*. Retrieved August 15, 2009 from http://serc.carleton.edu/NAGTWorkshops/visualization/collections/tsunami.html

Hawaii tourism info
Hawaii's Official Tourism Site (2009). *Hawai'i: The islands of aloha*. Retrieved August 15, 2009 from http://www.gohawaii.com/

Offical Website of the Hawaii Tourism Authority (2009). *Hawai'I Tourism Authority*. Retrieved August 15, 2009 from http://www.hawaiitourismauthority.org/

Hawaii Visitors and Convention Bureau (2009). Retrieved August 15, 2009 from http://www.hvcb.org/

Hawaii tsunami

Pacific Disaster Center (2009). Hawaii tsunami zones. Retrieved August 15, 2009 from http://www.pdc.org/iweb/tsunami_zones.jsp