GEO 201 – EARTHQUAKE CASE STUDIES
Scientific Details and Societal Impacts

Introduction

There are two fundamental goals for this activity: 1) teach earthquake basics and 3) provide a social justice perspective of the impact of earthquakes; that is illustrate that earthquake impacts are strongly dependent on economic, historical cultural and social constructs of the affected areas. The intent for the first goal is straightforward – understanding earthquakes basics is a fundamental area for physical geology. A social justice lens for this activity provides an avenue for us to examine the inequitable impacts of geologic hazards. This perspective also provides an opportunity for us to look more deeply and broadly at geologic hazards and perhaps examine actions that mitigate observed inequities. Finally, providing a human component to basic geologic content areas may bring more interest and motivation.

Direct Instruction and Guided Inquiry Experiences

Essential Questions:

- What is an earthquake?
- Where do earthquakes occur?
- What are the different types of seismic waves?
- How do we locate and measure earthquakes?
- What are the hazards associated with earthquakes?
- How can we decrease the impact of large earthquake events?
- What is the earthquake history of the Pacific Northwest?

Assessment:

- End of unit online quiz

Learning Activities:

- Direct instruction
- Epicenter and magnitude computer activities (Homework assignment)
- Mercalli Scale, Richter magnitudes and earthquake hazards activity (Class activity)

Project: Case Studies of Earthquake Events

Learning Outcomes

Individuals in each group should learn:

1. Geologic details of a significant large earthquake event.
2. Hazards associated with a significant large, earthquake event.

3. Details of the economic and human impact of an earthquake event.
4. Details of the global response to earthquake event.
5. Long term impacts of earthquake event.
6. Social, economic, historical and cultural characteristics of the region impacted by the earthquake event.
7. Potential inequities that exist in human and economic impacts for global earthquake events as well as between different earthquake events.
8. Reasons for observed inequities in impact or response to earthquake hazards.

Skills Outcomes

Students should develop the following skills:

1. Ability to access earthquake data from United States Geological Survey website and display it on Google Earth.
2. Ability to connect images and PowerPoint slides to Google Earth placeholders through a website.
3. Ability to make a presentation using Google Earth as a platform.
4. Ability to research, analyze and communicate the scientific, economic and social/demographic data pertaining to earthquake events.
5. Ability to evaluate evidence for inequity in impact and response to earthquake events.

Assessment

How will I know if learning outcomes have been reached?

- Group presentations will be graded based on organization of the presentation (10 pts). Individual grades will be based on the information, organization and presentation of your specific role in the project (20 pts).
- Individual writing products will be graded based on writing and grammar proficiency and depth of content. This will be due on the day of the online quiz and included in your quiz grade.

Activities and Products

- Each group will develop and present a Google Earth-based presentation that highlights the specifics of an earthquake event.
- Each person will write a 2 page essay for the exam that will explore connections between earthquake impacts and social issues.

Procedure

1. In the pre-assessment you will write about your knowledge, experiences and interest in earthquakes and the impact of earthquake events. The instructor will use this information to form groups.
2. Each group will consist of 4 people. Each person will develop expertise related to the specific questions and will be responsible for that portion of the presentation. The final product should coherently mesh information from each of the specialties.
    a. Geologist – responsible for questions 1 and 2
    b. Economist – responsible for questions 3-5
    c. Social anthropologist/Historian – responsible for question 6
    d. Nongovernment Organization (NGS) official – responsible for questions 7 and 8

3. The product will be a Google Earth based presentation, which you will present to the class. You will receive both a group and individual grade for this part of the project.
4. During other group presentations you will take notes on the geologic features, social and economic impacts related to the event. Information from other group presentations will show up on the online quiz.
5. Read the article "Seismic Inequality"
6. Attend guest speaker presentation to learn more about the impact of earthquakes from an aid worker's perspective. Be prepared to ask questions about the speaker's experience.
7. Write a 2 page, single spaced essay that discusses the issue of "Seismic Inequality" referencing specifics about the impact of earthquake events, how impacts may not be equitable distributed, reasons for the observed inequity and details from the guest speaker presentation.
8. In your essay consider what actions, both big and small, could be taken to reduce earthquake impact and observed inequities in impacts. Reference specific literature where appropriate.

Resources

These references are mainly online articles about Japan 2011 and Haiti 2010 earthquakes. There are likely other articles about different major earthquake events such as Sumatra 2004. Students read these references to gain perspective on the impact of different earthquake events, especially the major difference in recovery efforts between the two major events. I have students read these articles prior to guest lecturer presentations; all students should read the Seismic Inequality referenced above.

- National Geographic: Safe House
- Two Years After Haiti's Earthquake, Women Are Still Shattered by Sexual Exploitation
- Why Is There No Looting In Japan
- Japanese Preparedness Likely Save Thousands
- Japan Earthquake: Before and After
- Global Development
- Haiti Earthquake Recovery 3 Years Later: Where Has The Money Gone?
- NY Times – Haiti Special
- Donations to Japan Lag Haiti or Katrina
- USGS: Earthquake Top 10 Lists and Maps