

## QUIVERING, SHIVERING ALPS: TEACHER GUIDE

**Subject:** Earth Science

**Grade Level:** Middle School

**Last Updated:** February 15, 2008

### **Case Summary**

A team competing in a Survivor game has been given a challenge to explain the mysterious events in nearby Clayton, Georgia. Based on the eyewitness events of the citizens of Clayton, Georgia, the team must assemble to figure out the mysterious events of the previous night before chaos erupts in the town.

### **Credits**

This case was written by Bethany Brooks (PhD student, Department of Psychology, Emory University, Atlanta, GA) and Susan Dundee (teacher, Renfroe Middle School, Decatur, GA), fellows of the Emory University PRISM program (<http://www.prism.emory.edu>). The case was adapted with permission from an activity developed by Pamela J.W. Gore at Georgia Perimeter College:

Gore, P.J.W. (1998). *Dacula, Georgia earthquake intensity exercise*. Retrieved November 3, 2005 from <http://gpc.edu/~pgore/daculaquakedata.html>.

### **Learning Objectives**

Students will be able to describe, identify, and apply the following concepts or ideas:

1. Earthquakes as a destructive or constructive Earth force
2. Faults including strike-slip faults, normal faults, reverse faults
3. Interplate earthquakes and intraplate earthquakes
4. Types of stress in the Earth's crust including shearing, tension, and compression
5. Seismic waves, magnitude, and epicenter
6. The Mercalli Intensity Scale

### **Georgia Performance Standards**

*S7CS1*. Students will explore of the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works. (NSES Content Standard A)

*S7CS6*. Students will communicate scientific ideas and activities clearly. (NSES Content Standard A)

*S7CS7*. Students will question scientific claims and arguments effectively. (NSES Content Standard A)

- a. Question claims based on vague attributions (such as “Leading doctors say...”) or on statements made by people outside the area of their particular expertise.
  - b. Identify the flaws of reasoning that are based on poorly designed research (i.e., facts intermingled with opinion, conclusions based on insufficient evidence).
- S7CS8. Students will investigate the characteristics of scientific knowledge and how that knowledge is achieved. (NSES Content Standard A)
- Students will apply the following to scientific concepts:
- a. When similar investigations give different results, the scientific challenge is to judge whether the differences are trivial or significant, which often requires further study. Even with similar results, scientists may wait until an investigation has been repeated many times before accepting the results as meaningful.
  - b. When new experimental results are inconsistent with an existing, well-established theory, scientists may pursue further experimentation to determine whether the results are flawed or the theory requires modification.
  - c. As prevailing theories are challenged by new information, scientific knowledge may change.
- S6E3. Students will recognize the significant role of water in earth processes. (NSES Content Standard D)
- S6E4. Students will understand how the distribution of land and oceans affects climate and weather. (NSES Content Standard D)

## Assessment

**Students will create/complete the following activities; the grading of each was left to the discretion of the teacher, and was largely based on quality of presentation and accuracy of content.**

1. A faux news broadcast (actual recorded video) or newspaper article describing the event to local townspeople in North Georgia Survivor Series setting containing at least 8 terms from the vocabulary list (see below)
2. A map containing a plot of earthquake intensity data (obtained from local townspeople who experienced the earthquake), a contour of earthquake data, and the approximate location of the earthquake epicenter
3. A self-evaluation and peer evaluations

## Implementation Strategy

### Day 1

Read Scene 1	10 min
Data, Questions, Learning Issues (whole class)	15 min
Read Scene 2, hand out Scene 3 for students to look at in groups	10 min
Data, Questions, Learning Issues (whole class)	15 min
Research in computer lab/class work	40 min

### Day 2

Continue group work on assessments.

After reading through Scene 1, the students should complete a box chart and research any learning issues. In case you are not familiar with the theme of the Survivor Series on television, “Treemail” is the method by which survivor teams learn the challenges they will face and “Confessionals” are student diaries. After reading through the second scene, students will create another box chart and research any learning issues. The students should be able to get through Scenes 1 and 2 on the first day, but some students may move more quickly. If so, the third scene may be presented along with the Mercalli Intensity Scale and “Some Hints” page. The activity using the Mercalli intensity scale and the newscast/article should be completed after Scene 3 because Scene 3 confirms what the students should do in order to complete their assignment.

When preparing their presentation (newspaper article or news broadcast), the students should be presented with the vocabulary list. At least 8 of the 15 terms should be used in the presentation.

### **Case Notes**

This case can be used as an introduction to a lengthy topic in middle school Earth Science courses, earthquakes. It is the second case in the Survivor Mountain Series (a series with a theme similar to that of the “Survivor” television show), but it can be used separately from the other cases in the series. From this problem-based learning case, students will learn how to determine the magnitude and epicenter of an earthquake using the Mercalli Intensity Scale. Students’ understanding of earthquakes and associated terms are assessed with videotaped group newscasts or newspaper articles.

## Facilitator Guide:

**Scene 1:** After reading through this scene, students should complete a box chart (see example box chart in Case 1: Mystic Mountains) and research learning issues. Information can be recorded in the “Confessionals.”

Possible Facilitator Questions:

1. What do you think happened in Clayton, GA that alarmed the townspeople? Why do you think this?
2. Is it possible for an earthquake to be felt in North Georgia? Why or why not?
3. How can the townspeople’s comments be used to determine what happened?
4. Any learning issues that should be researched (e.g. seismologist, types of earthquakes, etc)?

**Scene 2:** After reading through this scene, students should complete a box chart (see example box chart in Case 1: Mystic Mountains) and research learning issues.

Possible Facilitator Questions:

1. What are the methods used to rank an earthquake according to its intensity?
2. How can the townspeople’s comments be used to determine what happened?
3. Any learning issues that should be researched (e.g. intensity, epicenter, methods to rank earthquakes according to intensity, etc.)

**Scene 4:** With this scene, students should be presented with a copy of the Mercalli Intensity Scale and the “Some Hints” page. After researching any learning issues, students can begin the assignments. It is necessary for the students to complete the plot/contour of the earthquake intensity data before beginning the newscast/article assignment.

Possible Facilitator Questions:

1. Any learning issues?
2. How will the work be divided among the students in the group?

## Resources

Gore, P.J.W. *Dacula, Georgia earthquake intensity exercise*. 1998 Retrieved October 5, 2007 from <http://gpc.edu/~pgore/daculaquakedata.html>