

GEORGIA ON THE MOVE: TEACHER GUIDE

Subject: Earth Systems

Grade Level: High School

Last Updated: January 11, 2010

Case Summary

Earthquakes in Georgia, no way! CNN.Com reports on the event that shook many Georgians into disbelief. As a result of an entire regions lack of preparedness a concerned group of young scientists have decided to investigate, design, and distribute publications on the hazards of plate tectonic movements.

Credits

This case was written by Christy Hodges (teacher, Miller Grove High School, Lithonia, GA) and Jennifer Sweeney Tookes (PhD candidate, Anthropology, Emory University, Atlanta, GA) fellows of the Emory University PRISM program (<http://www.prism.emory.edu>). Authors may be contacted at jennifer.tookes@gmail.com or christy.hodges@comcast.net.

Learning Objectives

1. Interpret diagrams of plate tectonic settings produced by plates diverging, converging, and sliding past each other.
2. Explain how the Richter scale is used to convey the magnitude of seismic activity.
3. Categorize data and images associated with the damaging effects of earthquakes (magnitude).
4. Describe hazards associated with specific plate tectonic settings.
5. Relate local geologic features to specific plate tectonic settings.
6. Explain how specific plate tectonic settings formed local igneous and metamorphic rock and mineral resources.
7. Associate seismic wave activity to the magnitude of a seismic event.

Georgia Performance Standards

- SCSh1.* Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.
- SCSh2.* Students will use standard safety practices for all classroom laboratory and field investigations.
- SCSh3.* Students will identify and investigate problems scientifically.
- SCSh4.* Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.
- SCSh5.* Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.
- SCSh6.* Students will communicate scientific investigations and information clearly.
- SES2.* Students will understand how plate tectonics create certain geologic features, materials, and hazards.

- a. Distinguish among types of plate tectonic settings produced by plates diverging, converging, and sliding past each other.
- b. Relate modern and ancient geologic features to each kind of plate tectonic setting.
- c. Relate certain geologic hazards to specific plate tectonic settings.
- d. Associate specific plate tectonic settings with the production of particular groups of igneous and metamorphic rocks and mineral resources.

Assessment

In groups, students will construct a graphic organizer that includes the following information for each type of boundary plate movement (converging, diverging, and sliding past each other): draw the process and label the Earth's layers, explain the process, and new land formation. The graphic organizers will be presented on butcher paper where students will creatively display the required information. Grading will use a 4 point rubric in the categories of content, graphic organizer, relevant vocabulary, neatness and organization, and source(s) documentation.

Students will also create an informative publication of their choosing (tri-fold brochure, poster advertisement, flyer, newsletter, recorded Public Service Announcements with written scripts, etc...) that educates the public on the hazards associated with major seismic events. They must address what people should do if such an event happens. The publications will be graded using a 4 point rubric on the categories of content accuracy, amount of content, relevant illustrations, creativity, neatness, and source(s) documentation.

Implementation Strategy

Day 1

1. Students create a box chart* in their interactive notebook
2. Have class read Scene 1 5 min
3. Consulting with their group members, but keeping an individual copy, students should fill in their box charts 5 min
4. Using books and computers, students research the Learning Issues 40 min
5. Distribute and Collect Group Roles Sheet 5 min
6. Distribute and explain graphic organizer assignment, "Movers and Shakers"
7. Work on "Movers and Shakers" in groups 30 min
8. Class ends with a brief oral quiz by teacher to verify students' learning 5-10 min

Day 2

1. Display and present graphic organizers to the class 15 min
 - a. Only 2-3 randomly selected groups will present
2. Read Scene 2 5 min
3. Working with the class but filling in their own copies, complete box charts* 20 min
4. Provide directions for projects, "Shake, Rattle and Roll"
5. Work with groups on projects 30 min
6. Class ends with a brief oral quiz by teacher to verify students' learning 5-10 min

Day 3

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| 1. Student groups work on publication and for group presentations | 60 min |
| 2. Group presentations | 30 min |

*Guide the students to create a box chart similar to the following:

Observations	Questions
	Possible questions might include: What is an earthquake? Why are they rare in the south? What is magnitude? Why does it matter/measure? What is epicenter? What is the US Geological Survey? What are aftershocks? What does seismically active mean?
Hypotheses	Learning Issues

Case Notes

What went well:

1. The first scene went well, with the students interested in the setting of "CNN studios" complete with spotlights (lab lights attached to the back of a chair and aimed at their faces) and a beaker "microphone" for the news correspondent "on the scene" at the back of the room.
2. We found that by having the scene performed **before** passing out the student copies, they stayed with the group better and paid more attention, rather than simply going on to start with the box chart on their own.
3. Rather than simply asking the students to record ideas in their notebooks unprompted, we projected a powerpoint slide of the box chart on the screen. One facilitator circulated and prompted facts/observations, then questions from the lab groups while the other typed up their words. This made them much easier for the students to read, allowed us to fit more on the board, and allowed them to keep up with their own charts better as I already had the ideas down.
 - a. When it came time to distinguish the learning issues from the other questions, we simply changed the text colors on the screen.

What did not go well:

1. The students found the first assignment, "Movers and Shakers" confusing. We have reworded and re-organized the assignment sheet, and hope that the revisions will address these issues.

2. Many of these concepts and learning objectives were difficult for the students to understand. It would be beneficial to insert several brief, 5-10 minute lectures into the case process to clarify student learning and make sure they are on track.