

When the Earth Moves

day 313



- Grades: 7-8
- Fernando Carbajal Segura, Public School 6039
- Earth science
- Technologies: Real-time data via Internet, email, presentation software



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In Perú,
students gain
new understanding
of plate tectonics

LIMA, Perú—Is it possible to predict where in the world earthquakes are likely to happen in the future? Just ask students at Fernando Carbajal Segura, Public School 6039. After completing an in-depth investigation of plate tectonics that involved analyzing real-time data retrieved from the Internet, they have a deeper understanding of why the earth shakes where and when it does.

Roy Santiago Rodríguez Carvajal teaches students who are 13 and 14 years old and in their third year of secondary school. He designed the recent earthquake investigation to accomplish a number of goals, including the use of technology as a compelling tool for learning. At the start of the project, he admits, "My students felt like the use of technology was only to play." As they got into the project, he saw a transformation. "They had a greater interest to search for information. Their use of the equipment kept improving, and now they see technology as a very important tool for learning."

Rodríguez Carvajal launched the project by having students pose their own hypotheses about why earthquakes occur and whether there is a relationship between temblors and volcanoes. To test their theories, they accessed real-time data about current seismic activity all over the world. The information was freely available through the U.S. Geological Society (www.dister.unige.it/geofisica/autom/mondo.txt) and the Incorporated Research Institutes for Seismology. Using a world map, they plotted the latitude and longitude of active sites. Using email, students posed questions to experts and also exchanged observations with students at other schools.

After gathering all this information and marking their maps, students began to see patterns emerge. "They compared their maps with a map identifying the different tectonic plates, and realized that the active earthquakes and volcanoes are located exactly on the borders of the plates" explains Rodríguez Carvajal. "The theoretical knowledge helped create a better understanding of the subjects." The Web sites that students consulted in their research also proved compelling. "Their structure is simple, dynamic, and entertaining with graphics and pictures that are animated and easy to understand."

Next, students wrote research papers in which they compared their results with their original hypotheses. Motivation soared when students learned they would be sharing their work with readers around the world through a Web project site called Musical Plates. (Musical Plates is sponsored by the Center for Improved Engineering and Science Education, Stevens Institute of Technology. Web sites related to this project include the Spanish version of Musical Plates, www.k12science.org/curriculum/musical



Students began by making hypotheses about why earthquakes occur.

Preparing to publish online, Rodríguez Carvajal's students "put forth their greatest effort and made use of the necessary skills to have a good presentation," reports the teacher. He noticed students paying more attention to everything from vocabulary to data analysis to visual aids as they got ready to publish.

Rodríguez Carvajal's class size averages 42 students. Many of them, he notes with good nature, are taller than he is. He gets a laugh when he has to stand on a chair to turn on the video monitor mounted on the wall. His classroom has four networked computers, along with a digital camera, scanner, Web cam, and other donated equipment. Few students have access to computers at home although many make use of cyber cafés. Salamanca is an urban zone of Lima with a population of about 8 million.

As a result of the earthquake project, students are starting to use cyber cafés for more serious research instead of just entertainment and online chatting with friends. Rodríguez Carvajal was delighted when a student emailed him a link to a site with information about the history of seismic activity in Peru. "This was gratifying," he says.

Students also take evacuation drills more seriously now. "They understand that we are in a very seismic area, since we're located at the border of the Nazca Plate and the South American Plate." When it's time for a drill, they quickly exit the three-story building and move to safe zones. "The change in behavior

[plates3/es*](#), and the English version, www.k12science.org/curriculum/musicalplates3/en .)

is outstanding," Rodríguez Carbajal says, "showing the importance of the application of projects like this."



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Motivation soared when students learned they would be sharing their work with a worldwide audience.

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