Earthquake in Italy
NewsDepth, April 9, 2009
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Overview:

Italy's most devastating earthquake in over 3 decades struck its medieval city of L'Aquila leveling buildings, killing over 200 people, and injuring more than 1500. The magnitude 6.3 earthquake struck the city on Monday and damaged churches, palaces and medieval towers in a region devastated repeatedly by quakes in past centuries. Some 10,000 to 15,000 buildings were either damaged or destroyed, officials said. L'Aquila Mayor Massimo Cialente said about 100,000 people were homeless. Rescue workers are still searching for the missing. Students will learn more about what causes earthquakes and why Italy has been the repeated victim of these natural disasters.

Grade Level: Grade 4

Subjects: Science

Standards: Students will be able to describe evidence of changes on Earth's surface in terms of slow processes and rapid processes (e.g. volcanic eruptions, earthquakes).

Classroom Activities:

1. **Activity #1 Discovering L'Aquila** (15 minutes)
   - L'Aquila, whose name means "The Eagle" in Italian, was built around 1240 by Holy Roman Emperor Frederick II and was under French, Spanish and papal domination during the centuries. The high-flying bird was both the emblem of Frederick and reflects the 2,300-foot altitude of the proud city. Though not a major tourist destination like Rome, Venice or Florence, L'Aquila boasts ancient fortifications and tombs of saints.
   - Many Romanesque, Gothic, Baroque and Renaissance landmarks were damaged, including part of the red-and-white stone basilica of Santa Maria di Collemaggio. The church houses the tomb of its founder, Pope Celestine V — a 13th-century hermit and saint who was the only pontiff to resign from the post. The bell tower of the 16th-century San Bernardino church and the cupola of the Baroque Sant'Agostino church also fell, the ministry said. Stones tumbled down from the city's cathedral, which was rebuilt after a 1703 earthquake. "The damage is more serious than we can imagine," said Giuseppe Proietti, a Culture Ministry official. "The historic center of L'Aquila has been devastated."

- Students can locate the earthquake site here at this interactive website: http://news.bbc.co.uk/2/hi/uk_news/7986352.stm
  (This site is features a map that can be used with students to help them explore the coverage of the Italian earthquake in video audio, pictures and text.)
- Also you can visit http://news.yahoo.com/nphotos/Strong-earthquake-hits-central-Italy/ss/events/wl/040609italyquake#photoViewer=/090408/481/4e3ca2f727e14515a87d2016eee6797c where students can view additional photographs of the devastated area.

2. Activity #2 "**Why Italy?**"

- What causes an earthquake? After the devastating 1906 San Francisco, California earthquake, a fault trace was discovered that could be followed along the ground in a more or less straight line for 270 miles. It was found that the earth on one side of the fault had slipped compared to the earth on the other side of the fault by up to 21 feet (7 m). This fault trace drew the curiosity of a number of scientists, especially since nobody had yet been able to explain what was happening within the earth to cause earthquakes. Up until this earthquake, it had generally been assumed that the forces leading to the occurrence of earthquakes must be close to the locations of the earthquakes themselves. Harry Fielding Reid, after studying the fault trace of the 1906 earthquake, postulated that the forces causing earthquakes were not close to the earthquake source but very distant. Reid's idea was that these distant forces cause a gradual build up of stress in the earth over tens or hundreds or thousands of years, slowly distorting the earth underneath our feet. Eventually, a pre-existing weakness in the earth--called a fault or a fault zone--cannot resist the strain any longer and fails catastrophically. This is something like pulling a rubber band gradually until the band snaps. This theory is known as the "elastic rebound theory."
  http://projects.crustal.ucsb.edu/understanding/elastic/intro-rebound.html
  This website also includes an animation link which shows how the earth gradually distorts around a fault.
- Take students to the National Geographic Site which has an excellent video entitled "Earthquakes 101"
  http://video.nationalgeographic.com/video/player/environment/environment-natural-disasters/earthquakes/earthquake-101.html
- The question is: Why has Italy had so many earthquakes? Scientists blame Italy's tragic history of earth tremors on the fact that the country lies directly over the Eurasian and African fault lines, where the borders of two tectonic plates move together and apart. This also accounts for Italy's relatively high number of active volcanoes.
  These are two sites that can provide addition information about this:
  http://article.wn.com/view/2009/04/06/Italys_history_of_deadly_earthquakes/
  http://article.wn.com/view/2009/04/07/Timeline_Major_quakes_in_Italy_in_last_100_years/

Online Lesson Plans:

http://www.pbs.org/newshour/extra/teachers/lessonplans/science/earthquakes.html
PBS's NewsHour lesson plan: You don't need a seismograph to study earthquakes.
Overview: Earthquakes are difficult to predict. Most of our scientific investigation occurs after the event. Increasingly, scientists are discovering ways to predict and prevent loss of life associated with these phenomena. This lesson will help students to understand earthquakes.

http://www.education-world.com/a_tsl/archives/02-1/lesson001.shtml Education World lesson plan designed for older grades, but can be modified for younger students.
Overview: This lesson helps students understand the processes used to identify the location of an earthquake's epicenter and how the Richter magnitude of the earthquake is determined.

Additional Resources:

http://earthquake.usgs.gov/learning/
United States government's Earthquake sight "About Earthquakes" with links to kids pages

http://www.pbs.org/wgbh/nova/teachers/resources/subj_03_03.html#eart_7
Nova's site for earthquakes

http://www.uky.edu/KGS/education/earthquakes.htm
Earthquake websites provided by the University of Kentucky

http://sciencespot.net/Pages/kdzethsci2.html
The Science Spot and Kid Zone earthquake links

http://environment.nationalgeographic.com/environment/natural-disasters/earthquake-profile.html
The National Geographic "Earthquakes" site

http://www.abag.ca.gov/bayarea/eqmaps/kids.html
ABAG Earthquake Info Kids Zone