

Earthguide Online Classroom - Mystery Detectives Activity Series

Focus on 6th Grade Earthquakes and Plate Tectonics

November 16, 2010 10:30 AM – 12:30 PM, 1:15 PM - 2:15 PM

Scripps Institution of Oceanography

Presenters:

Felicia Ryder, Wangenheim Middle School
Memorie Yasuda, Earthguide
at Geosciences Research Division, SIO

Earthguide is an undergraduate internship program that produces online educational media in Earth and Ocean Sciences.

Activities include:

- Plate Tectonic Settings
- Locating Earthquake Epicenters
- Bathymetry & Topography
- Layering in the Earth

Workshop agenda

A. Where to find this document online

Posted to Earthguide Online Classroom website

<http://earthguide.ucsd.edu/eoc/index.html>

Direct link

http://earthguide.ucsd.edu/eoc/special_topics/ms_earthsci/sp_ms_earthsci.html

B. Why earthquakes and plate tectonics?

10 minutes

Living with ongoing hazards in southern California – recognizing the need for hazard mitigation

Understanding context – that earthquakes are common because of the particular type of plate tectonic margin that exists nearby

Science Content Standards for California Public Schools - covering standards related to plate tectonics and locating earthquake epicenters

Ocean literacy – highlighting the importance of plate tectonic processes that originate in the oceans, and the role of technologies that allow us to explore and observe this new frontier

Special research focus at SIO – communicating the valuable expertise and current research of scientists at Scripps

C. Discussion – The San Andreas Fault Zone as an Unusual Case of a Transform Plate Margin

40 minutes

**Using interactive visual aids from Earthguide
Discussion expanding on Dr. Peach’s earlier presentation**

- Distinguishing tectonics and plate tectonics
- Distinguishing transform plate margins
- Key oceanic processes that drive plate motion and changes in plate size
 1. **Seafloor spreading** at midocean ridges (a kind of divergent plate margin)
 2. **Subduction** at subduction zones (a kind of convergent plate margin)
- Types of plate margins - situations associated with certain geologic hazards
 1. **Convergent margins** – large mountain ranges, some with Andean volcanoes, unusually deep earthquakes
Examples - Pacific Northwest at Cascadia Subduction Zone, Sunda Trench, Himalayas
 2. **Divergent margins** – volcanism and shallow earthquakes
Examples – Mid-Atlantic Ridge, East Pacific Rise, East African Rift
 3. **Transform margins** – relatively shallow earthquakes, no Andean volcanism
Examples – many at midocean ridges, unusual case of the San Andreas Fault
 4. **Not at a plate margin** – few earthquakes, rare volcanism
Examples – center of continental U.S., area around Hawaii
- Why we have earthquakes, but no active Andean volcanoes in southern California

D. Classroom activities

120 minutes

1. How seismic waves can be used to locate the origin (epicenter) of earthquakes
Mystery Epicenter

Activities 2 and 3 will be presented as time permits

2. How the passage of earthquake waves can be used to image the interior of the Earth
Mystery Inside the Earth
3. How the reflection of sound waves can be used to estimate distance and thus the shape of the Earth’s surface, including the shape of the seafloor
Mystery Bathymetry & Mystery Topography
4. Preview
Mystery Alien Landing & Mystery Marine Debris

E. Online resources related to this presentation

10 minutes

1. This handout
http://earthguide.ucsd.edu/eoc/special_topics/ms_earthsci/materials/handout.pdf
 2. Powerpoint slides used in our presentation
Links and other resources used in our presentation
 3. http://earthguide.ucsd.edu/eoc/special_topics/ms_earthsci/materials/presentation.ppt
 4. Mystery Detectives activity resources
http://earthguide.ucsd.edu/mystery_detectives/teach/
 - Mystery Inside the Earth
 - Mystery Topography
 - Mystery Bathymetry
 - Mystery Epicenter
 5. Middle School Plate tectonics resources at EOC
http://earthguide.ucsd.edu/eoc/middle_school_t/t_tectonics/t_tectonics.html
 6. Earthguide Online Classroom (EOC) resources
<http://earthguide.ucsd.edu/eoc/>

Earthguide resources
<http://earthguide.ucsd.edu/>
 7. Felicia Ryder's Moodle page
Contact Felicia Ryder – fryder@sandi.net
Mike Senise – msenise@sandi.net
 8. Questions about the web-based materials
Contact Memorie Yasuda – myasuda@ucsd.edu
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