

Using Paired Teaching for Earthquake Education in Schools



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• Raising awareness of earthquake science, hazards, and safety in schools.

 Supporting teachers with hands-on lesson plans and interactive videos for use in classrooms.

 Engaging geoscientists in public education and outreach.

 Using accessible technology to enhance scientist-teacher interaction in classrooms.

What is paired teaching?



Introduce the topic Highlight its relevance Ask confounding questions Invite students to work on the activity

Provide answer(s) Summarize results of the previous activity Present the content Ask questions Invite students to work on the next activity

Provide answer(s) Summarize results of the previous activity Provide a summary Draw conclusions Invite students to learn more about the topic Wrap of the lesson

Present guidelines for the teacher (Teacher's Guide)

(~25 minutes) Activity 1 Activity 2

In-class Teacher

te: the orange arrows indicate a prerequisite for the next segment (i.e., a task g that needs to be completed before continuing with the next segment. During each in-class activity, the video is turned off, and the activity is done under the guidance of in-class teacher.





Solmaz Mohadier explains the scientific method including how to observe, describe and catagorize scientific data.



earthquakes and slingshots are similar.



Ruth Amey uses a carbord model of a strike-slip fault to show what happens transform plate boundaries.



ewis Mitchell operate a simple faul model that shows the earthquake

Video library & lesson plans

1. Journey to the Center of the Earth Earth's Interior & Plate Tectonics

Question: What is inside the Earth and how do we know that? Activities:

- Using a slinky to model earthquake waves.
- Comparing an egg to the layers of the Earth.

• Discussing limitations associated with the egg model.

2. Living on the Edge **Discovering Plate Boundaries**

Question: What happens at plate boundaries? Activities:

- Observing scientific data near plate boundaries.
- Describing and classifying the data.



atthias Nettesheim (left) explains how liquefaction occurs in saturated, unconsolidated soils.

3. Soft Rocks & Hard Liquids **Properties of Earth Materials**

Question: How and why rocks deform? Activities:

Applying stress to different materials.

 Observing and classifying each material as elastic, in-elastic ductile, or in-elastic brittle.

4. Do you know your faults? - strike-slip fault - shear - neither extension Plate Motions and Faults

Question: What does stress do to faults? Activities:

 Observing what happens to a pizza dough when put under different types of stress.

 Making cardboard models of faults and discussing model limitations.

5. What Causes That Rock'n'Roll? The Earthquake Machine

Question: Can earthquakes be predicted? Activities:

- Building and operating a model showing the earthquake process.
- Using the model to test earthquake prediction.
- Discussing model limitations.



hazards in her office space.



Sophie Gill and Matthew Kemp use simpl materials to test building models on a shake table.



Sophie Gill and Matthew Kemp go to the about buildings shaking in an earthquake.



essica Starke strikes a metal pan with a spoon to explain the transfer of energy in

6. Rocking, Rolling and Bouncing How Do Earthquakes Move the Earth?

Question: What does an earthquake feel like? Activities:

- Using a set-up (the left photo) to show how waves transmit energy.
- Using human bodies to model earthquake waves.
- Demonstrating earthquake waves using a Slinky toy.



7. Flow With the Sand Introduction to Soil Liquefaction

Question: Why do some buildings sink during earthquake shaking? Activities:

- Using a simple model to find out how liquefaction occurs.
- Discussing how experiment model can be modified to avoid liquefaction due to shaking.

8. Safe or Unsafe? Nonstructural Hazards During Earthquakes

Question: How safe is your classroom? Activities:

- Making a list of all nonstructural elements in the classroom.
- Identifying elements that can pose hazard during an earthquake.
- Solmaz Mohadjer points out nonstructural Identifying nonstructural hazards that can be fixed at no/little cost.

9. On Shaky Ground (Part 1) **Structural Hazards During Earthquakes**

Question: Why do some buildings collapse during an earthquake? Activities:

- Using different materials to show how they respond to different forces.
- Constructing building models and testing them under a heavy weight.
- Testing models on a mini shake table.

10. On Shaky Ground (Part 2) Structural Hazards During Earthquakes

Question: Why do some buildings collapse during an earthquake? Activities:

- Using swings to demonstrate natural frequency and resonance.
- Testing a wooden block on a shake table at different frequencies.
- park to find out what swings can teach us Building a wall model, testing it during shaking, modifying it to make it resistant to shaking.



What's next?

• Complete the remaining videos

- Landslide hazards
- Earthquake geodesy
- Earthquake drills, plans and supplies

• Record voice over for selected videos

- Translate videos - German
- Persian (Farsi/Dari/Tajik)

Feedback & Evaluation

- Collect feedback from online users
- Implement and evaluate selected videos in school classrooms
- Modify content/pedagogy based on collected feedback

What can you do?

School Teachers:

- Use videos
- Evaluate videos
- Suggest a topic
- Translate a video lesson*

*We're looking for German and Persian speakers.

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Access videos for free: www.youtube.com/user/EuroGeosciencesUnion

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