

Teacher _____ Date _____ Class _____

Period(s) _____

Grade: 4 Course: Science

Lesson Topic: _____

Objectives		Correlation to State Documents		
The student should be able to:		COS	SAT	AHSGE/EXIT
1) Describe geological features of the Earth, including bodies of water, beaches, ocean ridges, continental shelves, plateaus, faults, canyons, sand dunes, & ice caps.				
2) Identify questions that can be answered through scientific investigation		4: 1		
3) Think critically & logically to make inferences & describe relationships between evidence & explanations.		4: 5		
4) Investigate alternative explanations of experimental results.		4: 6		
Activities/Methods		Resource Materials		Assessment
1) Explain the concept of an earthquake involving movement of tectonic plates (Use <i>Teacher Cheat Sheet</i> if needed).			Textbook	Check homework
2) Describe what a seismologist does.			Overhead Masters	Test/Quiz
3) Divide class into teams of four: writer, examiner, experimenter, and organizer. (Class of 24= 6 groups of 4)		X	Workbook/Handouts	X Project
4) Give each team two 2X4 blocks, clay, and newspaper (teacher provides).			Multimedia Materials	X Participation
5) Ask the “writer” to write names of group members on the “ <i>Earthquake</i> ” worksheet.		X	Hands-On Materials	Class work
6) Ask “Organizer” to place the 2 blocks side by side with the long edges adjacent on desk/table.			Reference Materials	Review
7) On a piece of newspaper, the “organizer” flattens clay into a 2-3mm sheet large enough to cover both blocks. Sheet of clay is then placed and mashed onto the 2X4 blocks, representing the Earth’s surface.			Other Supplies	Presentation
8) Have “experimenter” slowly slide one block forward.				Oral Responses
9) Ask “examiner” to check results of the “Earth’s surface”.				X Teacher Observation
10) Writer writes results on “ <i>Earthquake</i> ” worksheet. Group answers questions.				Other
11) Repeat 6-10, only “experimenter” slides blocks quickly.			Textbook	Check homework
Comments:	Accommodations	Initials	Remediation Activities	
Set up includes: Distributing ‘Earthquake’ worksheets, and materials for project..	Extended Time			
Materials include two 2X4 blocks, clay, and newspaper (provided by teacher) per group.	Preferential Seating			
Can be extended by creating “roads” or other physical structures on the surface and seeing how the earthquake affects them.	Testing Accommodation			
	Segmented Assignments			
Extend activity:	Copy of Teacher Notes			
Can be extended by creating “roads” or other physical structures on the surface and seeing how the earthquake affects them. Online info on earthquakes can also be utilized.	Assignment Length		Enrichment Activities	
	Communication		Simulation activity	
	Assignment Notebook			
	Peer Tutor		Character Education	
Homework:	Other: Copy of chart		Respect for environment	

Non Instructional Events _____

Earthquake!

Name of the writer: _____

Your job is to write things down throughout the experiment.

Name of the organizer: _____

Your job is to give out supplies, which are 2 wood blocks, clay and newspaper.

Name of the experimenter: _____

Your job is to carry out the actual experiment with the blocks, clay, and paper.

Name of the examiner: _____

Your job will be to check the results of the experiment and tell the writer to write down what you see.

Questions

What happens to the surface of the earth when the blocks move SLOWLY?

What happens to the surface of the earth when the blocks move QUICKLY?

How might the speed and strength of the earthquake affect people living near the fault?

“Teacher Cheat Sheet”

Set Up:

Divide class into teams of 4. Maximum 24 students.
If group has 3 members give 1 person 2 tasks.

Assign each student a role as the “writer,”
“organizer,” “examiner,” or “experimenter.”

Distribute blocks and clay. Also, teacher must
provide newspaper.

Distribute “Earthquake!” handout.

Directing discussions:

Although it seems solid, the Earth’s surface is a dynamic grid of brittle, slow-moving sections called *tectonic plates*. These plates make up the *lithosphere* – the outer layer of The Earth.

Underneath the lithosphere lies the hot asthenosphere, which can cause the movement of tectonic plates. Sometimes as the plates move, energy is released in the form of an earthquake, which are sudden, sometimes violent shaking due to this release of energy.

The movement of tectonic plates can be of three types:
Diverging (Extensional) – plates move apart
Converging (Compressional) – plates collide together
Transforming – plates slide past each other

Since the rock plates are jagged, their movements bind, but as the hot magma below continues to drag the plates, the plates are violently jerked free causing tremendous energy release and sending seismic waves through the ground as an earthquake.

Seismologists are scientists that study seismic activity in the surface of the Earth. *Seismographs* are important tools in studying earthquakes. They record vibrations during an earthquake and can be printed out as a *seismogram*.

Earthquakes can also be measured in a mathematical formula called *The Richter Scale*, which measures the magnitude of individual earthquakes from *M1*, a very small magnitude not generally felt by humans, to *M9*, a rare, great earthquake causing catastrophic damage.

Information on recent earthquakes, including world maps with plots of earthquakes, magnitudes and populations, and historic earthquake photos can be obtained at www.earthquakes.usgs.gov

Experiment:

Teacher guides teams through the steps allowing time for teams to answer questions.

1. Materials are given to each team.
2. Team members are given tasks. The “writer” records the name of members by their assigned task.
3. The “organizer” places blocks long ways side by side. To the side, he/she then flattens clay to a sheet approximately 2-4mm thick, then presses clay onto the blocks and removes newspaper.
4. Have the “experimenter” slide one block slowly forward simulating slow movement of tectonic plates.
5. “Examiner” then reports the results of the “Earth’s surface” to the group.
6. The “writer” then writes the results on the “Earthquake!”
7. Repeat, only have “experimenter” move the blocks quickly.
8. Have the teams discuss the subsequent questions and have the “writer” write the group answers.
9. Lesson can be extended by repeating the experiment using small items representing roads, homes, etc. A discussion concerning wise decisions for land development near fault lines can also be conducted