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Quake! Epicenters & Magnitude Lab Activity

Aligned With All Published National Standards

ward's science

IMGN 250 8057

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framework for K-12 science education © 2012

* The Dimension I practices listed below are called out as **bold** words throughout the activity.

DIMENSION 1 Science and Engineering Practices

X	Asking questions (for science) and defining problems (for engineering)	X	Use mathematics and computational thinking
X	Developing and using models	X	Constructing explanations (for science) and designing solutions (for engineering)
X	Planning and carrying out investigations	X	Engaging in argument from evidence
X	Analyzing and interpreting data	X	Obtaining, evaluating, and communicating information

DIMENSION 2 Cross Cutting Concepts

	Patterns	X	Energy and matter: Flows, cycles, and conservation
X	Cause and effect: Mechanism and explanation		Structure and function
X	Scale, proportion, and quantity	X	Stability and change
X	Systems and system models		

DIMENSION 3 Core Concepts

Discipline	Core Idea Focus
Earth and Space Science	ESS2: Earth's Systems

X Indicates standards covered in activity

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Middle School Standards Covered	High School Standards Covered
MS.ESS2-2: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	HS.ESS2-1: Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.
MS.ESS2-3: Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.	HS.ESS2-2: Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth's systems.

(continued on next page)

standards/learning objectives

national science education standards © 1996

Content Standards (K-12)			
X	Systems, order, and organization	X	Evolution and Equilibrium
X	Evidence, models, and explanation		Form and Function
X	Constancy, change, and measurement		

Earth and Space Science Standards Middle School		Earth and Space Science Standards High School	
X	Structure of the Earth system	X	Energy in the Earth system
		X	Geochemical cycles

X Indicates standards covered in activity

benchmarks for science literacy (AAAS, © 1993)

1. The Nature of Science	1B: Scientific Inquiry
4. The Physical Setting	4B: The Earth
	4C: Processes That Shape the Earth
11.Common Themes	11A. Systems
	11B. Models

activity objectives:

- Examine seismograms of the same earthquake recorded at three different stations and identify P-wave and S-wave data.
- Determine the S-P wave lag time for each seismogram.
- Determine seismograph station distances using either the *Earthquake P-wave and S-wave Travel Time* graph or the *Distance for Epicenter VS. Travel Time for Local Earthquakes* graph.
- Determine the location of two earthquake epicenters using the triangulation technique.
- Determine the magnitude of an earthquake using distance and amplitude data and the *Nomogram for Richter Magnitude*.

time requirement:

These activities require two class periods.