Locating an Earthquake

The focus of an earthquake is the actual place within Earth where the earthquake originates. When locating an earthquake on a map, scientists plot the epicenter, the point on Earth's surface directly above the focus. To locate an epicenter, records from three different seismographs are needed.

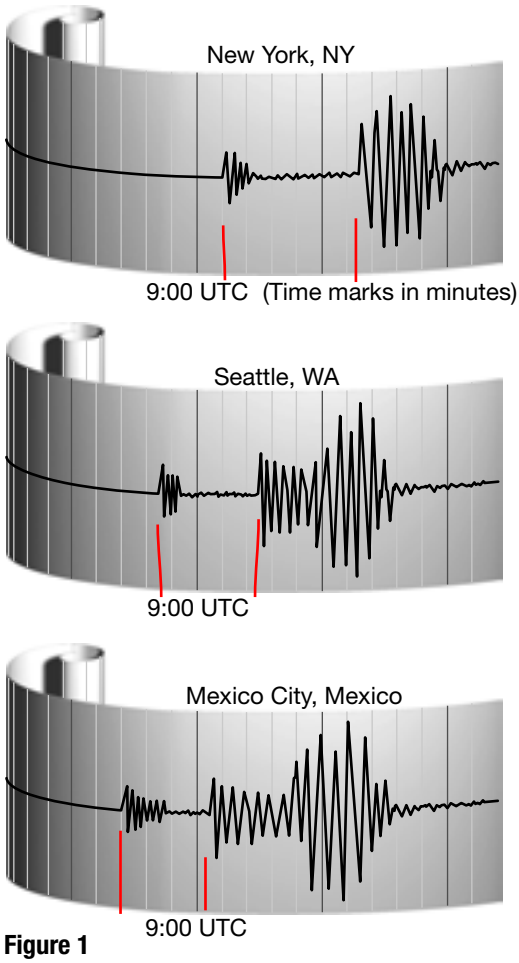

Figure 1

Problem How can you determine the location of an earthquake's epicenter?

Materials

- drawing compass
- world map or atlas

Skills Measuring, Interpreting Maps, Interpreting Graphs

Procedure

1. The seismograms shown in Figure 1 recorded the same earthquake. Use the Travel-Time Graph to determine the distance of each station from the epicenter. Record your answers in the Data Table.
2. Refer to a world map or atlas for the locations of the three seismic stations. Place a small dot showing the location of each of the three stations on the map in Figure 2. Neatly label each city on the map.
3. On the map in Figure 2, use a drawing compass to draw a circle around each of the three stations. The radius of the circle, in miles, should be equal to each station's distance from the epicenter. Use the scale on the map to set the distance on the drawing compass for each station. **CAUTION:** *Use care when handling the drawing compass.*

DATA TABLE

	New York	Seattle	Mexico City
Elapsed time between first P and first S waves	5.5	4	3.5
Distance from epicenter in miles	2450	1500	

Name _____ Class _____ Date _____

Analyze and Conclude

1. **Using Graphs** How far from the epicenter are the three cities located?

_____

_____

_____

2. **Calculating** What would the distances from the epicenter to the cities be in kilometers?

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3. **Interpreting Maps** What is the approximate latitude and longitude of the epicenter of the earthquake that was recorded by the three stations? Use the map in Figure 3.

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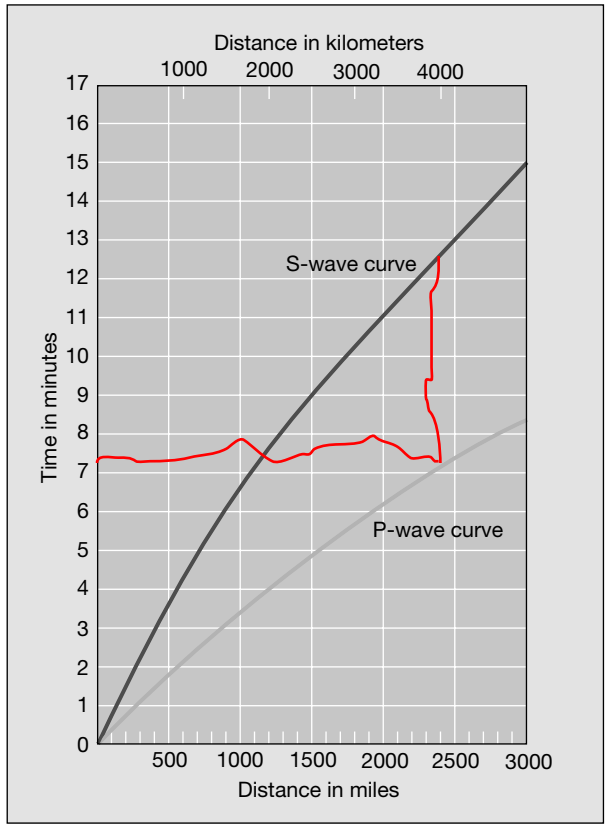

Figure 2 Travel-Time Graph

4. **Drawing Conclusions** On the New York seismogram, the first P wave was recorded at 9:01 UTC. UTC is the international standard on which most countries base their time. At what time (UTC) did the earthquake actually occur? Explain.

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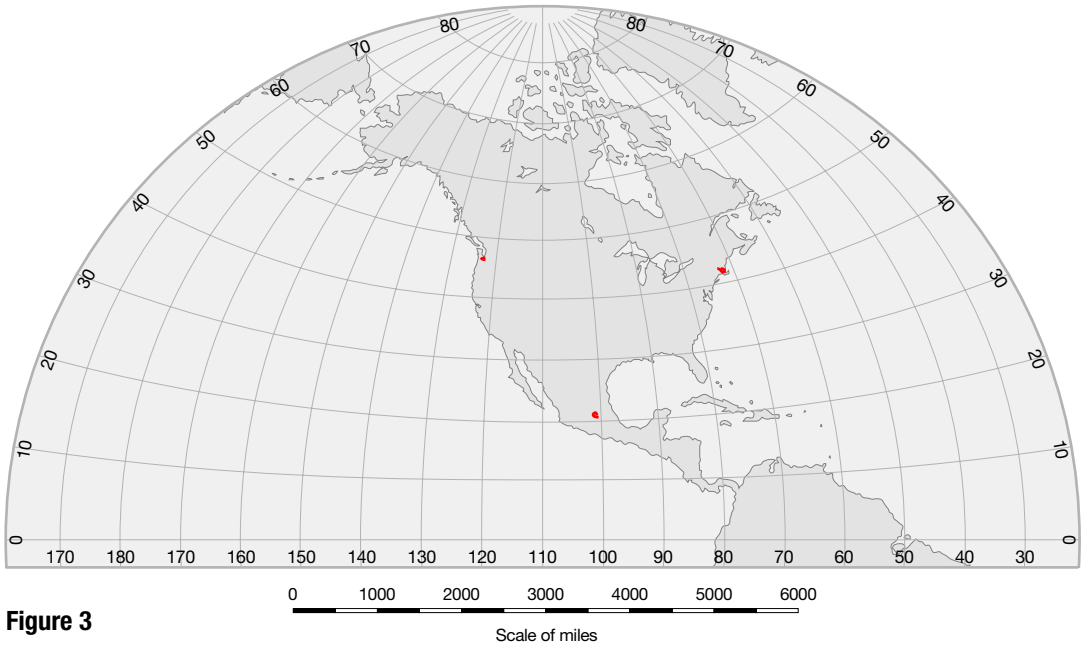

Figure 3