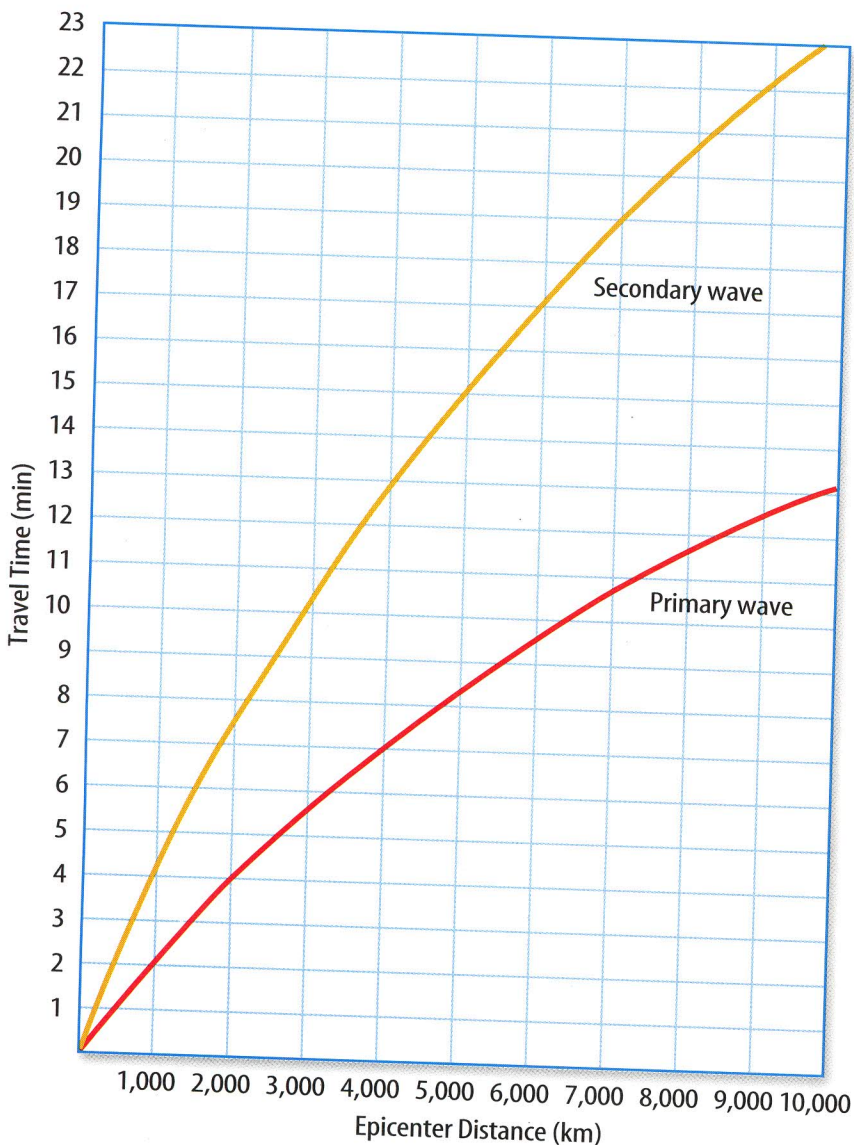


Figure 11

Primary waves arrive at a seismograph station before secondary waves do.

A This graph shows the distance that primary and secondary waves travel over time. By measuring the difference in arrival times, a seismologist can determine the distance to the epicenter.



Seismograph Stations Each type of seismic wave reaches a seismograph station at a different time based on its speed. Primary waves arrive first at seismograph stations, and secondary waves, which travel slower, arrive second, as shown in the graph in **Figure 11A**. Because surface waves travel slowest, they arrive at seismograph stations last.

If seismic waves reach three or more seismograph stations, the location of the epicenter can be determined. To locate an epicenter, scientists draw circles around each station on a map. The radius of each circle equals that station's distance from the earthquake epicenter. The point where all three circles intersect, shown in **Figure 11B**, is the location of the earthquake epicenter.

Seismologists usually describe earthquakes based on their distances from the seismograph. Local events occur less than 100 km away. Regional events occur 100 km to 1,400 km away. Teleseismic events are those that occur at distances greater than 1,400 km.

B The radius of each circle is equal to the distance from the epicenter to each seismograph station. The intersection of the three circles is the location of the epicenter. Why is one seismograph station not enough?

