Global Science
Mr. Noble

Name:
Date:
Period:

Finding Epicenters of Earthquakes

By recording the arrival of S and P waves at earthquake monitoring stations, calculations can be made to determine where the earthquake originated. In this activity you will find out how this is done if given the proper data.

P waves travel roughly at 6 Km/sec
S waves travel roughly at 4 Km/sec

Complete the following problems:

1. How many seconds would it take a P wave to travel 60 Km?

2. How many seconds would it take an S wave to travel 60 Km?

3. How much longer does it take the S wave than the P wave to travel 60 Km?

The answer to (#3) is called the lag time.

4. How many seconds would it take a P wave to travel 180 Km?

5. How many seconds would it take an S wave to travel 180 Km?

6. How much longer does it take the S wave than the P wave to travel 180 Km?

As you can see, each 60 Km adds 5 seconds to the lag time. A lag time of 30 seconds would mean the earthquake occurred 30 ÷ 5 x 60 Km, or 360 Km.
Here's the work:

5 sec + 5 sec + 5 sec + 5 sec + 5 sec + 5 sec = 30 seconds
60 Km + 60Km + 60 Km + 60Km + 60 Km + 60Km = 360 Km

7. What would be the lag time between P and S waves if the earthquake occurred 600 Km away?

Look at the seismograph on the next page. The record as found in three cities is shown in a simplified version. Fill in the table and use the compass technique shown by Mr. Noble to locate the epicenter on the map.

Location	Lag Time	Distance (lag time ÷ 5) x 60
Austin, Texas		
Portland, Oregon		
Bismarck, North Dakota