

CHAPTER 4: BUILDING THE CRUST

LABORATORY

LOCATING AN EARTHQUAKE

PURPOSE:

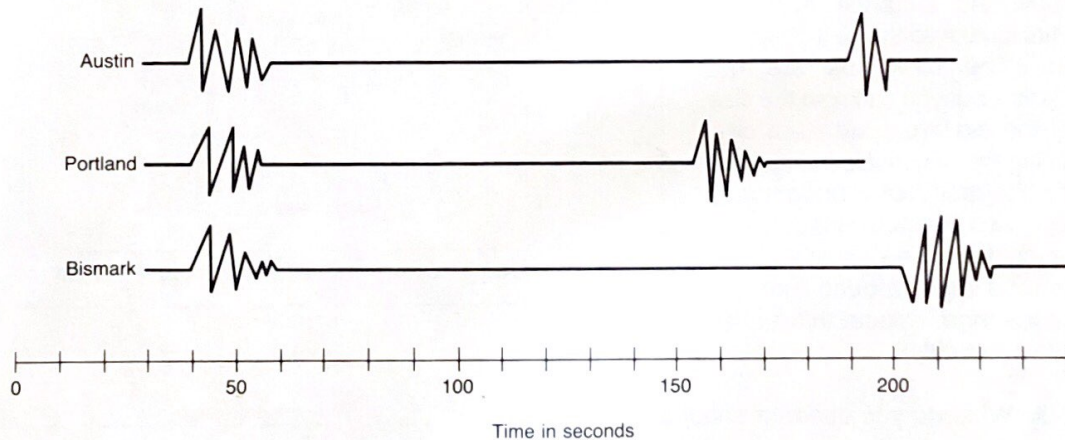
To locate an earthquake.

MATERIALS:

pencil compass

INTRODUCTION:

An earthquake gives off energy in every direction in the form of waves. Seismographs record these waves. The diagram below shows there are two kinds of waves. The first group are called P (primary) waves. The second group are called S (secondary) waves. S waves do not travel as fast as P waves. The time difference between the arrival of the P and S waves shows how far they have traveled. The time difference between the arrival of the P and S waves is used to calculate the distance to an earthquake.



PROCEDURE:

- A.** Record in the table below the arrival times of the P and S waves for each city. Then calculate the time difference in the arrival times of the P and S waves.

CITY	ARRIVAL TIMES		TIME DIFFERENCE
	P—WAVE	S—WAVE	
Austin			
Portland			
Bismarck			

CHAPTER 4 LABORATORY continued

- C. For each 12 kilometers that the P and S waves travel, the time difference between the two waves increases by one second. For example, after 24 kilometers, the S wave is 2 seconds behind the P wave. Using this information, calculate and record in the table at the right the distance from each of the cities that the earthquake occurred.

CITY	EARTHQUAKE DISTANCE
Austin	
Portland	
Bismarck	

- D. You now know how to find the distance to the earthquake from each of the cities. However, the direction from which the earthquake waves came is not known. For example, suppose you were in Portland. You would know how far away the earthquake was. Since you do not know the direction, the earthquake could be anywhere along a circle around you. But you also know the distance from the earthquake to the two other cities. The directions are not known, but you do know the size of the circle around each city. Using the map scale in Fig. 4-4, set the radius of your compass to match the earthquake's distance from one of the cities. Draw a circle around that city on the map. Repeat this for the two other cities.



3. What do you observe about the three circles? _____

CONCLUSIONS:

1. Approximately, where did the earthquake take place?
- _____

2. What information is necessary in order to determine the location of an earthquake?
- _____