

Name: _____

Earthquakes

Date: _____ Period: _____

Earth Science

Lab Activity: Locating Epicenters

INTRODUCTION:

Geologists who study earthquakes are called seismologists. If you were a seismologist, you would receive earthquake data from all across the country. Within minutes, seismologists would record the times of arrival of the P waves and S waves. From the seismic wave data collected, they can then use this data to zero in on the exact location of the earthquake's epicenter.

OBJECTIVE:

You will learn how to interpret a seismogram and use the data from three different seismograms to locate the epicenter of an earthquake.

VOCABULARY:

Epicenter -

Focus -

Focal Depth -

P-wave -

S-wave -

Lab Activity: Locating Epicenters

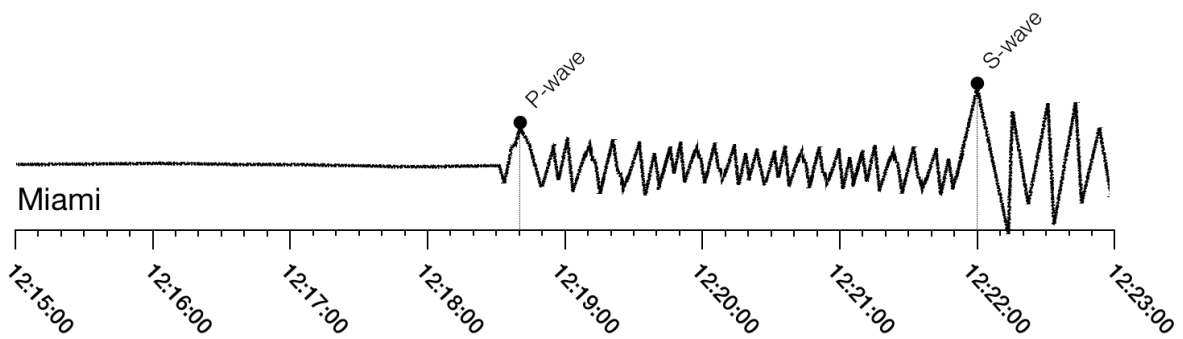
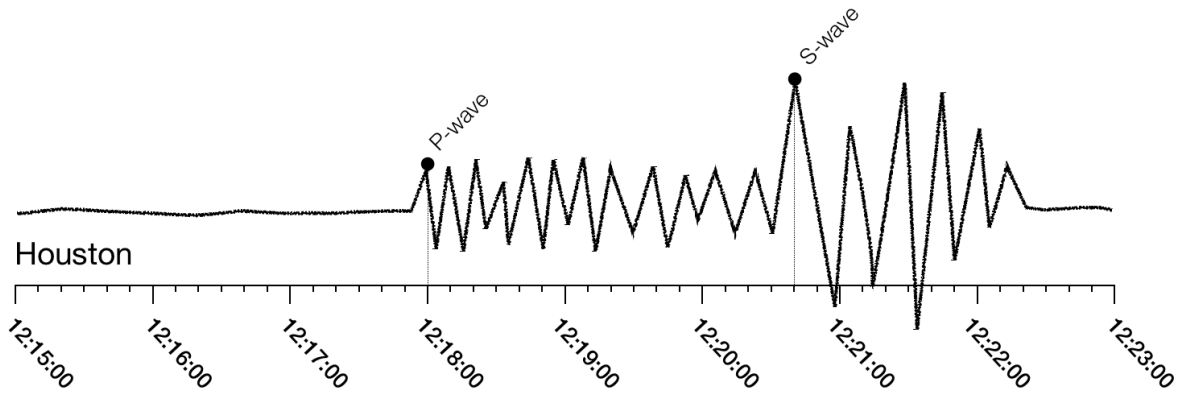
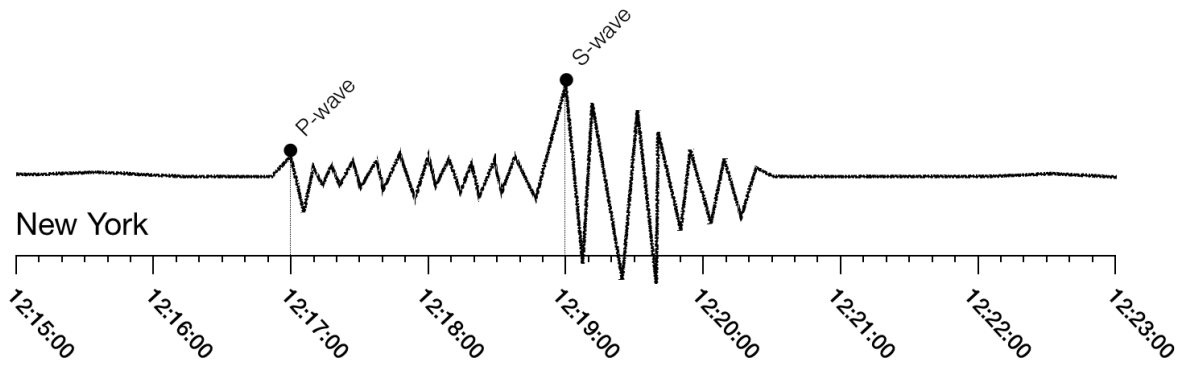
PROCEDURE A:

1. Use "Seismograms A" to calculate the following for each city and fill in the chart below:
 - The arrival time for the P-wave and S-wave.
 - The difference in the arrival time between P-wave and S-waves.
 - The distance in kilometers of the epicenter from each city.
 - The length of time it took for the P-wave to travel from the epicenter to each city.
 - Calculate the time at which the P-wave started.
2. Using Map A on page 122, locate the epicenter by constructing a circle whose radius is equal to the distance from the city to the epicenter for all three cities.
3. Where all three circles meet, draw a "X" and label it "epicenter".

Station	Arrival Time		Difference in Arrival Time	Distance to the Epicenter	P-wave Travel Time	Time of Origin
	P-wave	S-wave				
New York						
Houston						
Miami						

Lab Activity: Locating Epicenters

SEISMOGRAMS A



Lab Activity: Locating Epicenters

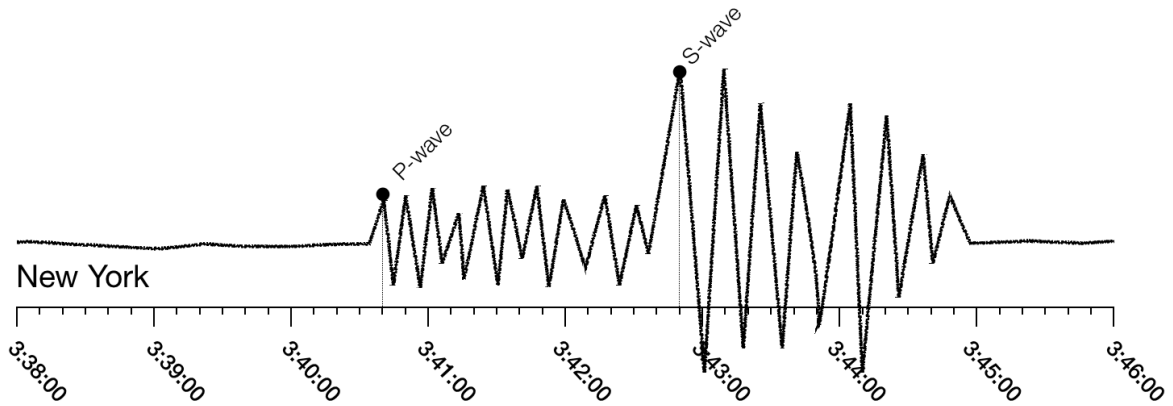
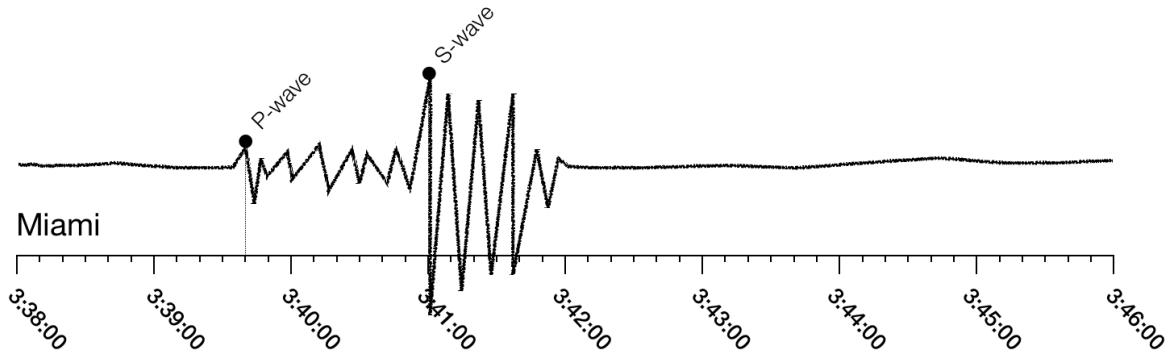
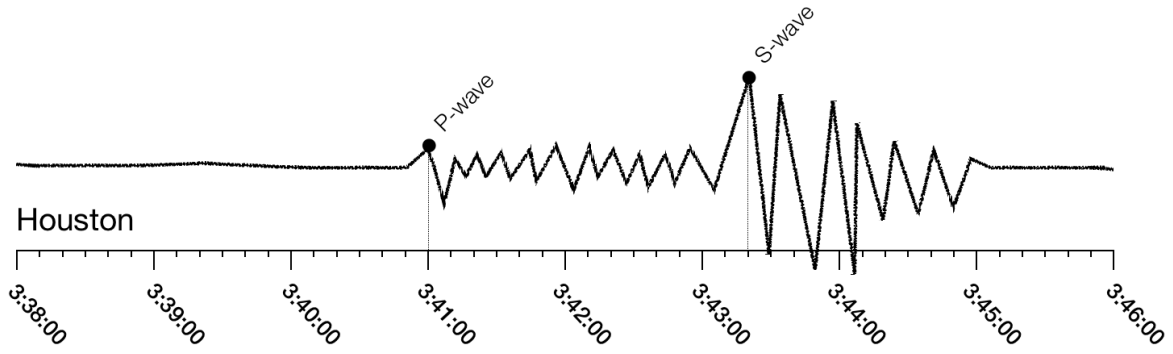
PROCEDURE B:

1. Use "Seismograms B" to calculate the following for each city and fill in the chart below:
 - The arrival time for the P-wave and S-wave.
 - The difference in the arrival time between P-wave and S-waves.
 - The distance in kilometers of the epicenter from each city.
 - The length of time it took for the P-wave to travel from the epicenter to each city.
 - Calculate the time at which the P-wave started.
2. Using Map B on page 123, locate the epicenter by constructing a circle whose radius is equal to the distance from the city to the epicenter for all three cities.
3. Where all three circles meet, draw a "X" and label it "epicenter".

Station	Arrival Time		Difference in Arrival Time	Distance to the Epicenter	P-wave Travel Time	Time of Origin
	P-wave	S-wave				
Houston						
Miami						
New York						

Lab Activity: Locating Epicenters

SEISMOGRAMS B



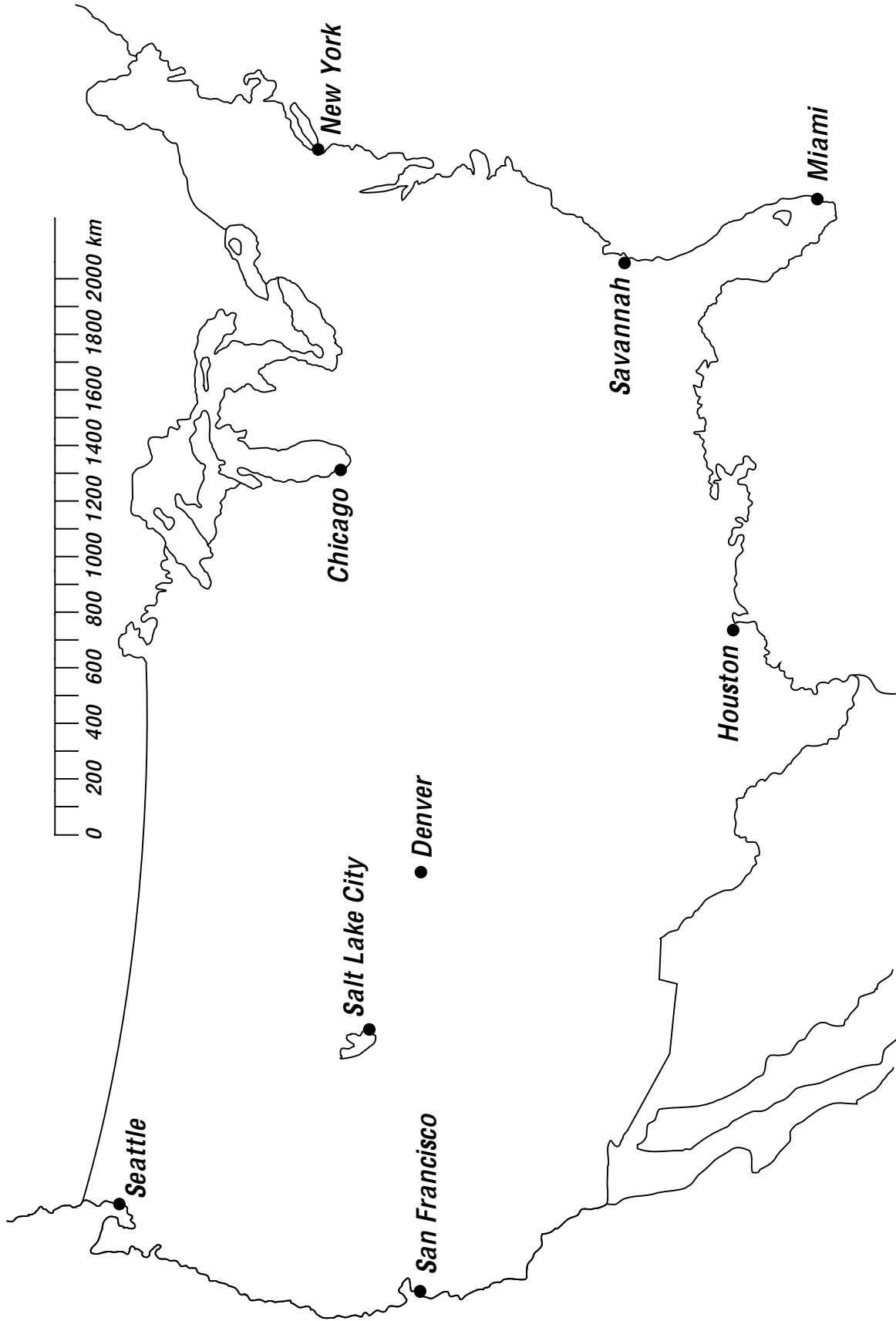
Lab Activity: Locating Epicenters

DISCUSSION QUESTIONS:

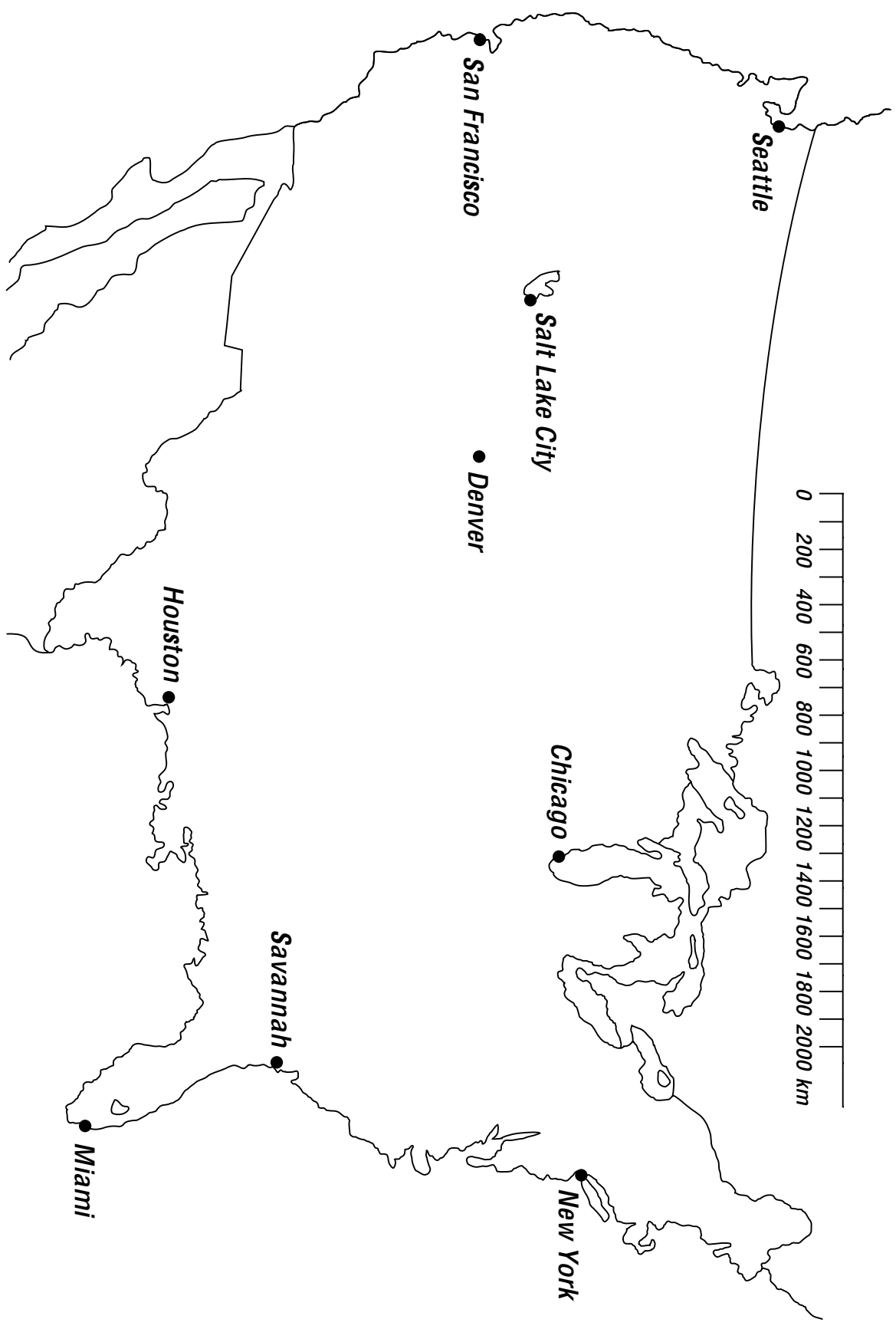
1. What is the approximate location of the epicenter for the seismograms A?
2. What is the approximate location of the epicenter for the seismograms B?
3. Why does the p-wave always arrive at a seismic station prior to the s-wave?
4. Why is three the minimum number of stations necessary to locate an epicenter?
5. Why does the arrival time difference become greater as distance increases?

CONCLUSION: Describe, step by step, how the epicenter of an earthquake can be located?

MAP A



MAP B



Lab Activity: Locating Epicenters

Earthquake P-Wave and S-Wave Travel Time

